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Airport '95

Far from the buzz of Denver, airports like Houston's IAH are setting a course for unspectacular but effective IT that gets the job done without busting the budget. *By Tracy Mayor*

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Cover photo by Rocky Kneten

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Emerging markets now account for almost half of Avon's pretax profits. But the company's ability to thrive in these untested markets depends on having excellent management, analysis and reporting tools. That's where its globally integrated financial strategy comes in. *By Peter Fabris*

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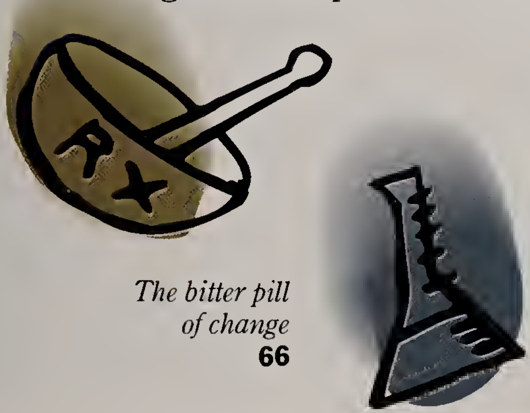
With changes sweeping the health-care industry, pharmaceutical companies are struggling to maintain healthy profits. And IT may very well be the spoonful of sugar that helps the medicine go down. *By E.B. Baatz*



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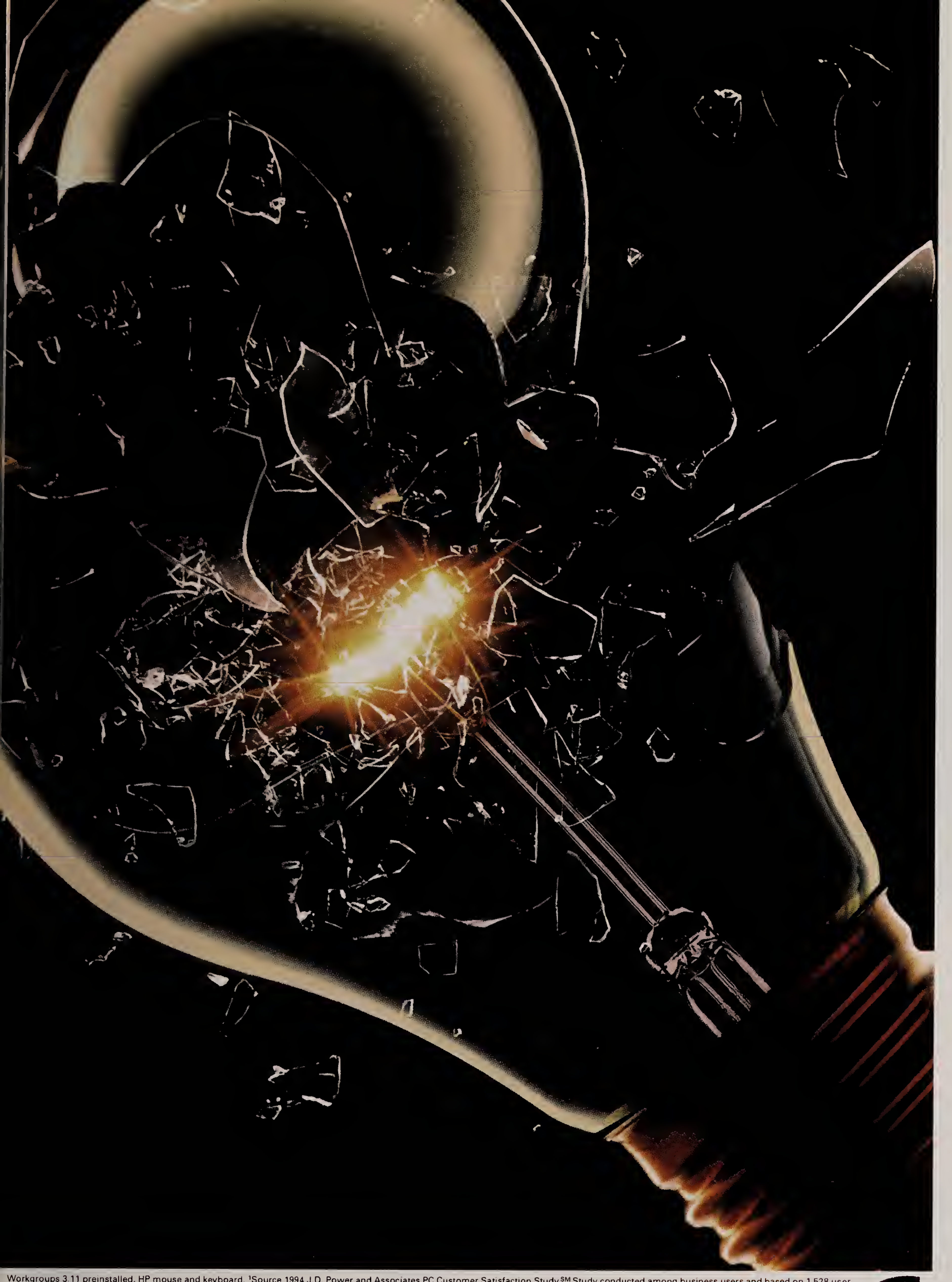

Workgroups 3.11 preinstalled, HP mouse and keyboard. [1]Source 1994 J.D. Power and Associates PC Customer Satisfaction Study.℠ Study conducted among business users and based on 1,528 user
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LETTER FROM THE EDITOR

A tidal wave of change is buffeting the U.S. pharmaceutical industry. Much of this change is being brought about by market and governmental forces, but technological innovation is a key, as well.

Several factors are driving this change. Of greatest significance, the traditional customer base of individual doctors is being supplanted by big, powerful buying groups. Simultaneously, manufacturers' costs are soaring (R&D investments in the pharmaceutical business double every five years, for example), but pressure from the buying groups and jawboning by the Clinton administration are holding down price increases. Meanwhile, market conditions are increasingly uncertain, while competition from generic drug makers is intensifying. On top of it all, the industry's information infrastructure is shifting.

This is a world-class American business in sharp transition. Pharmaceutical manufacturers have undergone more change in just the last three years than in the previous 25. That's why Senior Writer Elizabeth Baatz chose to zero in on the pharmaceutical industry as part of our ongoing Preparing for Change series. (See Page 66.)

In the midst of all this flux, drug companies are not sitting still. One marketing technique they have adopted is called "disease management." Disease management requires the collection of massive amounts of patient data to track the progress of diseases, the costs of treating them and the long-term effectiveness of drug therapies. The goal is to ensure that a manufacturer's products make it onto the preferred drug list of the big buying groups.

In a frenzy of industry consolidation, drug companies last year either bought or began to build comprehensive disease-outcome and patient-cost databases. Eli Lilly and Co. now has a patient database of 55 million names. Tapping into them, CIO Tom Trainer will soon roll out new data warehouses and mine for innovative data applications.

Keep your eye on the rapidly changing relationships in the pharmaceutical business. Information executives could learn much from their colleagues in an industry where government, market and technological forces are colliding.

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CIO

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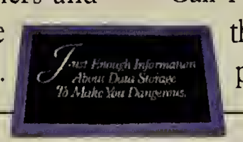

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TEXAS INSTRUMENTS

PHOTO BY WEBB CHAPPELL

It seems everyone, from the very reputable to the less than scrupulous, has been posting Internet "cool sites" and "hot lists." Well, now it's my turn. If nothing else, my listing will be successful at revealing my more personal, as well as my professional, interests:

- If you are an aficionado of classic cartoon and comic book art, check out Australia's Cartoon Heaven at *http://symphony.ucc.ie/~niall/cheaven.html*.
- Interested in gemstones? There are two facsinating sites: *http://www.primenet.com/~rgenis/homepagetwo.html* and *http://mineral.galleries.com/minerals/Gemstone/Class.html*.
- Once in a while I like to play a game of chance. A blackjack dealer can be found at *http://www.ua.com/blackjack/bj.html*. And the beauty of this site: You don't have to pay to play.
- On the more serious side, I like to dabble in investments. A robust site for information on personal finance and financial resources is located at *http://gnn.com/meta/finance*.
- I'm sure everyone in the computer industry has added The Dilbert Zone as a bookmark: *http://www.unitedmedia.com/comics/dilbert*.
- As a magazine publisher, I'm extremely impressed with *Advertising Age*'s Web site: *http://www.adage.com*. The daily news, discussion forums and columns keep me fairly abreast of what's happening with *CIO*'s clients.

I would have liked to list my favorite technology companies, but my editor says I get only 250 words and there are literally hundreds of companies utilizing the Web in innovative ways. The technology companies have clearly been the front-runner in the use of Internet and Web technology. The information they are providing to customers and prospects is limitless at some high-tech sites.

Finally, I'm unabashedly biased when it comes to one particularly cool site on the Web: CIO Communications. If you enjoy the printed versions of *CIO* and *WebMaster* magazines, you'll find even more great information at the CIO Web site: *http://www.cio.com*.

P.S. We are now taking reservations for the next Perspectives conference, "The Psychology of IT: The CIO's New Mind Set," to be held Oct. 15-18, 1995, at the Hyatt Grand Cypress Resort in Orlando, Fla. To reserve your space or for more information, please call 800 366-0246 or refer to our Web site: *http://www.cio.com/conferences/perspectiv.html*.

Coming In CIO

Global Strategies

How do IS executives at multinational companies coordinate their IS planning and IT strategies around the globe? The insights and experiences of three top executives will show what it takes to make it as a global CIO.

New Age R&D

The latest trend in R&D is toward applied—rather than pure—research, and technology is a key component to success. Many companies are using cutting-edge technology and software-driven structured planning efforts to get quicker paybacks from their R&D efforts by winnowing out unsatisfactory projects early on and reducing overall product development cycle times. R&D is also being pulled out of its ivory tower and into integrated cross-functional work teams by these concurrent development efforts; technologies such as groupware and videoconferencing aid this effort.

Legacy Systems

You've got millions of lines of Cobol responsible for billions of dollars of revenue. A move to client/server architecture is too great a challenge for your true mission-critical applications right now. Fortunately, there's good news—and sound technology—that lets companies nibble away at bread-and-butter systems without tossing them out completely. *CIO* looks at approaches to surround, rather than toss and rebuild, legacy systems in order to meet the demands of modern-day code.

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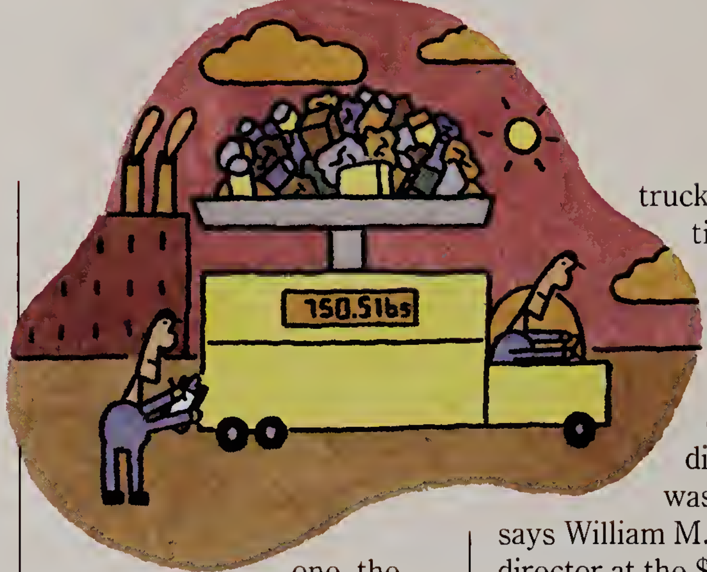
TRENDLINES

WASTE MANAGEMENT

How Does Your Garbage Grow

Personally, I've never considered garbage a weighty matter. Rather, it's more of a nuisance: The trail of weekly detritus that one tows curbside is, like the leavings of one's coffeepot, just part of the daily grind. But try multiplying one person's leftovers by the waste stream of an entire office building, and you can see how it might turn into a heavyweight problem. At least, that's the view behind a new automatic data-collection program at Norcal Waste Systems Inc. in San Francisco that collects on-site information such as dumpster location and garbage weight.

The system, currently in test trials, works like this: IS sends route information to dump trucks via radio frequency waves, where it shows up on a touch screen inside the cab. When the truck gets to stop number one, the forklift that hoists the dumpster activates a passive electronic device inside the receptacle that sends the can's ID number aboard. Once the load is dumped, a second device in the bed of the truck records its weight. This data can help Norcal improve trucks' operational efficiencies and "refine how much it costs to collect and dispose of the waste stream," says William M. Durbin, MIS director at the $275 million company.



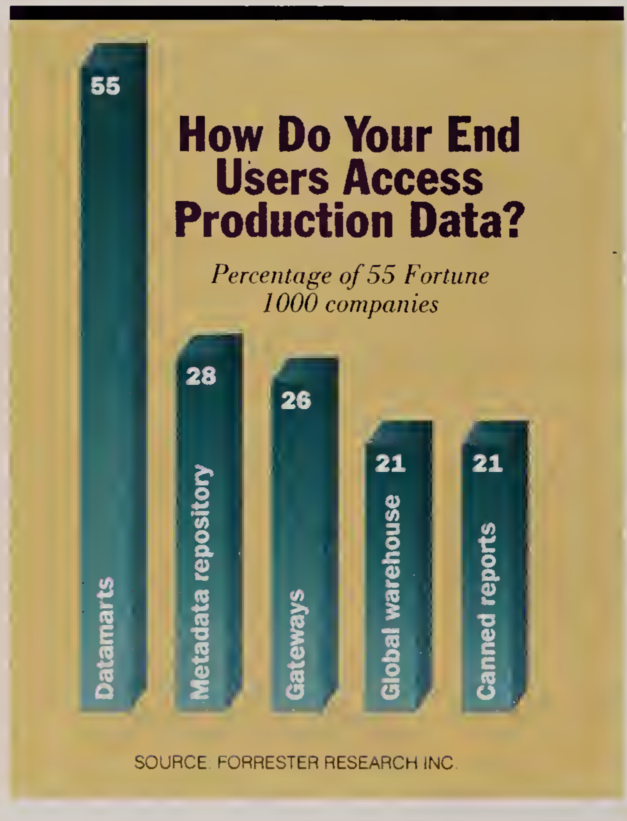
Norcal expects its garbage-information collection efforts to save it money not only by automating the billing process but by enabling the company to refine it as well, Durbin says. Waste-management companies charge customers on a per-dumpster basis. Landfills, however, charge the garbage companies by weight. The refuse of a restaurant, with all its wet garbage, is likely to weigh much more than that of a retail store, which has a lot of cardboard. By weighing the garbage, Norcal can develop a two-tier pricing scale—one for heavyweights and one for paperweights, as it were—that more accurately reflects each customer's trash habits.

The system could help in other ways as well. Many states have laws aimed at reducing the amount of refuse hauled to landfills. California, for example, wants to reduce the amount by 25 percent in 1995 and 50 percent by 2000. By identifying the biggest dumpers, "we can get a clearer idea of how to reduce that," says Durbin—perhaps in part by having them pay a higher rate. This is one case where garbage in does not necessarily equal garbage out.

–Carol Hildebrand

When Less Is More

If you're thinking about setting up a corporatewide data warehouse for your company, you may want to think again. According to Forrester Research Inc., such huge "oceans" of centralized data can leave users lost at sea.



How Do Your End Users Access Production Data?

Percentage of 55 Fortune 1000 companies

SOURCE: FORRESTER RESEARCH INC

Giving them access to smaller, well-defined "fishing ponds" of data is a better bet.

Vast global data warehouses are often ignored by end users, who lack both the time and training to navigate them. "It's too easy for smart, business-savvy end users to get lost in the sprawling 'databasements' that MIS builds in the name of better data access," says Donald A. DePalma, senior analyst in Forrester's Software Strategy Service. Instead, Forrester recommends the use of "datamarts"—local databases targeted to specific end-user needs.

In a survey of 55 Fortune 1000 companies, Forrester found that the majority did plan to implement such smaller databases. But such efforts, although less expensive than data warehouses, are still not cheap: The typical startup costs for a datamart are just under $300,000, the market researcher says.

For information, call 617 497-7090.

ILLUSTRATION BY JAMES KACZMAN; CHART BY LINDA GOLON

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CAT SCANNING

If Felix the Cat lives in Marin County, as of Nov. 9, 1995, he will be sporting a new high-tech accessory. That's when officials of Novato, Calif., put into effect an ordinance not only requiring cat owners to register their felines but stipulating that the cats be ID'd, preferably by having a tiny microchip implanted in their shoulders.

Cat owners pay $7 for the chip, which is the size of half a grain of rice and was developed seven years ago by InfoPet Identification Systems Inc. of Burnsville, Minn. (see "Trendlines," *CIO,* August 1989). The chip is encoded with a 10-digit owner ID number read by scanning equipment provided to city animal shelters by InfoPet. This is a much more reliable means of ID than the traditional collars and tags, which are easily removed or lost. To encourage pet owners to choose the chip, officials are charging significantly more ($15) for the alternative, a tear-away collar ID.

But like every new application of technology, this one has its glitches, too. AVID Corp., a privately held company in Norco, Calif., which claims to have a million animal implants in its registered database, and newcomer Schering-Plough Corp.'s Animal Health division have also entered the pet ID market. Like the grocery-store scanner market in its early days, each of these companies has its unique codings. Without a universal scanner, many city pounds are reluctant to expend the time and money on different scanners.

Some veterinarians are also questioning the success rate of the chips. In Atlanta, where the Humane Society implanted 507 microchips in dogs and cats, only three lost animals were found with the scanner last year. Furthermore, the general public remains concerned about possible "Big Brother" applications of this technology in the human population. But with shelters euthanizing 10 million cats annually, pet lovers are chipping away at these concerns. Municipalities in Southern California, Florida, Minnesota and Georgia have all implemented InfoPet technology.

–E.B. Baatz

DISTANCE LEARNING

GETTING THERE FROM HERE

In the sparsely populated hinterlands of Vermont and northern Maine, the high-tech revolution has been transforming the higher education process. Since 1989, for example, a TV, a VCR and a portable telephone have been the instruments for providing advanced reading, writing and 'rithmetic for students at the North Haven Island community school 10 miles off the Maine coast. But pilot projects of the late 1980s and early 1990s have yielded to mainstream policy with mainstream, albeit strapped,

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PLEASE DON'T HAVE YOUR TICKET READY

The air-travel industry is no stranger to IT (see "Airport '95," Page 48), and ticketless travel is one of the latest examples. Several airlines have been experimenting with the idea of eliminating tickets as a way to cut down on paperwork and long lines at the ticket counter. Now, Southwest Airlines is taking the ticketless concept a step further: ticketless baggage check. According to an article in *The Austin American-Statesman*, the airline recently began testing a new wireless handheld computer that will allow passengers flying ticketless to check their bags at the curb.

In January 1995, Southwest became the first major carrier to offer ticketless travel for all of its flights. About 30 percent of its passengers currently fly ticketless, saving the airline roughly $25 million a year. More than 4 million passengers have flown Southwest without tickets, and it expects to carry more than 11 million that way by the end of 1995.

Federal regulations require that passengers show proof of their reservations in order to check a bag—a problem for those with no tickets to show. Using the new, 486-based handheld computers from Telxon Corp., however, skycaps can electronically verify a passenger's reservation, then issue a receipt. Eventually, adding scanners and card scanners could allow the skycaps to handle cargo as well.

Southwest plans to offer ticketless booking via the SABRE reservations system and via the Internet by December 1995. It can be found on the World Wide Web at *http://iflyswa.com.* ■

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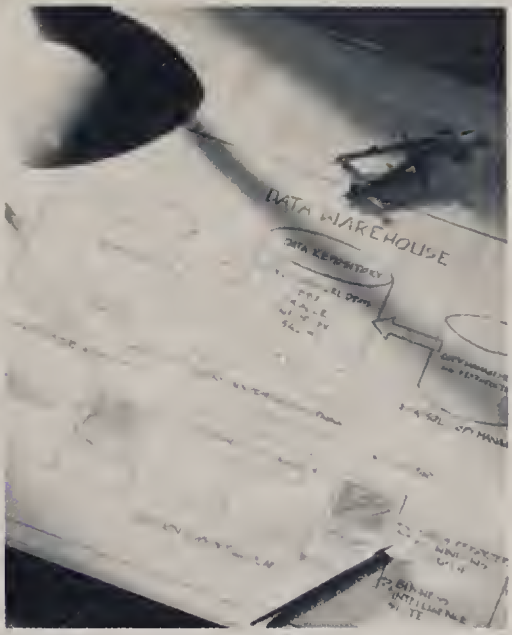

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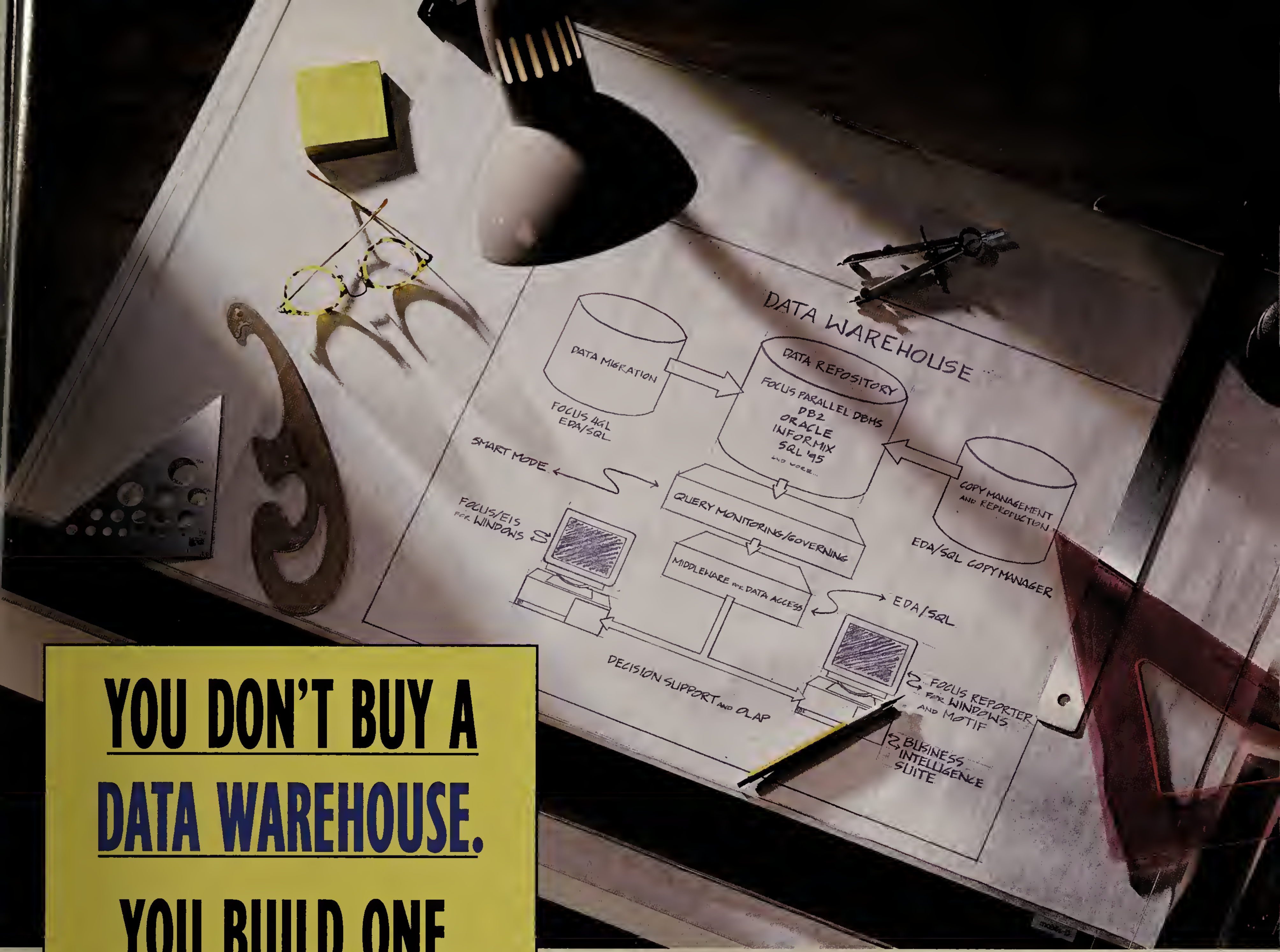
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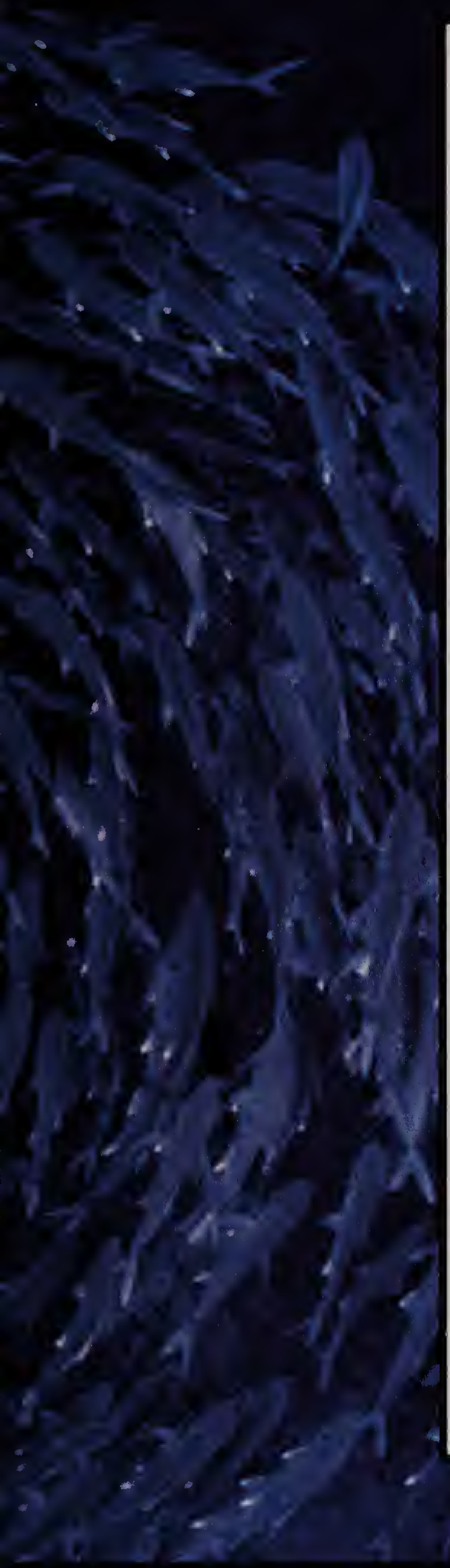

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funding in the mid-1990s.

Today, the Education Network of Maine offers 65 courses via interactive television leading to five associate's degrees and two master's degrees at more than 100 locations across the North Country. Each semester, about 4,000 students enroll in credit courses through the network, and an additional 25,000 residents use the network for teleconferences and training.

"Informational and learning networks spanning distances and cultures are allowing us to bring vast and rapidly expanding collections of print and visual materials directly to students," says George P. Connick, president of the University of Maine at Augusta.

For example, the University of South Carolina in Columbia provides a master's degree in library science to Maine graduate students, and Fort Collins, Colo.-based National Technological University broadcasts training programs to Maine businesses via satellite.

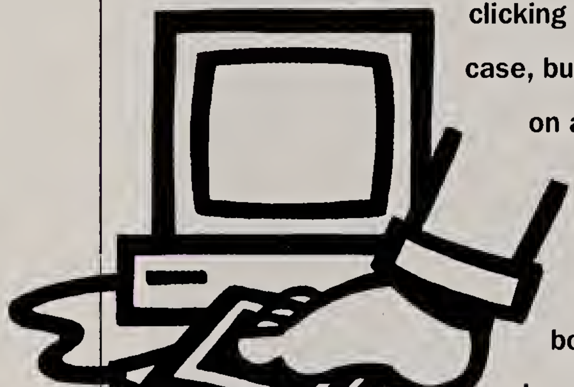
In Vermont, distance-learning activity over the past decade has been equally unstoppable, despite recessionary state budgets. In 1984, the IBM computer chip manufacturing plant in Essex Junction funded a small grant to Vermont Technical College in Randolph Center to explore using two-way telecommunications links to provide courses to plant workers. That led to the Vermont Interactive Television (VIT) system, and in 1989, a fledgling interactive audio/video system (with interactive links via T-1 lines) received its first state appropriations of $350,000.

With 12 sites now online, the state continues to fund its distance-learning system with approximately $300,000 a year. But by partnering with local private sources for matching funds and raising user fees, the interactive educational service remains a high statewide priority. "Day-to-day oversight is provided by a gubernatorial-appointed coordinating council whose membership includes representatives of all three partners in the VIT system: education, business and state government, including legislators," says Charles I. Bunting, chancellor of the Vermont State Colleges and co-chair of the New England Board of Higher Education's Regional Commission on Telecommunications and Distance Learning.

As for the future, "the digitization of information, which has significantly transformed publishing and music, will have an equally profound effect on the way education is delivered," says Connick. For example, the University of Maine at Augusta introduced an introductory business course last year that allowed any student to participate anytime, anywhere. After questions about funding, how well professors and students will adapt to these changes remains the biggest unknown.

–E.B. Baatz

SOME FANCY FOOTWORK



This is a product Jane Jetson would love. For those days when your fingers are simply worn out from too much typing, mouse clicking or, in Jane's case, button pushing on an instantaneous meal dispenser, Bilbo Innovations Inc. has just what you need. The company's Step on It! Keyboard Control Pedals are custom-programmable foot switches that can take over the operation of selected manual input operations.

Specifically, the three pedals can be programmed to assign or reassign any three keys or mouse clicks to floor operation, reducing users' hand movements by allowing them to perform the operations with their feet instead. The default configurations assign the pedals to Shift, Ctrl and Alt, respectively, but they can also be programmed to operate keystrokes such as Esc, Return, PgUp or PgDn, a mouse click or even a macro of up to 13 characters.

Bilbo says the ergonomic devices can increase speed and efficiency, reduce the motions associated with repetitive strain injury and be useful for the disabled. And if the potential business benefits aren't tempting enough, the system is compatible with all PC games, joysticks and other game input devices.

Bilbo, based in Madison, Wis., can be found on the Web at *http://www.zoom.com/tae/bilbo/bilbo.html*, or by telephone at 800 203-0092.

A recent survey by CAUSE, a Boulder, Colo.-based association that promotes the use and management of IT in higher education, found that 19 percent of New England colleges and universities were "involved in distance education," compared with 48 percent of their counterparts in the rest of the country.

TOP ILLUSTRATION BY JAMES KACZMAN; BOTTOM ILLUSTRATION BY MARK FISHER

U S WEST Communications Makes the Right Connections

Winner of the 1995 Enterprise Computing Award
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Calling on the SAS® System for Critical Decision Making, the Telecommunications Leader Responds to Customers in More Ways than Ever

To meet the needs of 25 million customers spanning 14 states, U S WEST Communications is doing more than talk about customer service. It's *listening*— and transforming business processes to monitor every facet of customer interaction. Part of this transformation involves collecting, analyzing, and reporting on massive amounts of data—everything from daily call volume to disruptions in nearly 45 million miles of copper/fiber communication lines.

"Until recently, various organizations and systems within U S WEST Communications were responsible for portions of the data collection, reporting, and analysis tasks necessary to assess the performance of our business," says Ronald Telson, Director of Mass Markets and Operations-Processes. "We are now implementing a program to provide an integrated and unified approach to management-by-facts."

The Data to Meet the Demand

When it came to choosing the software to meet that business challenge, U S WEST Communications called on the SAS System of software. More than 28,000 companies throughout the world rely on the SAS System for its analytical breadth as well as its capabilities for data warehousing, for client/server applications development, and for graphical user interface—all of which U S WEST Communications found useful.

As a result, U S WEST Communications expects to achieve a key business goal—to monitor the quality of its processes and the health of its network.

That's why we've chosen them as the 1995 recipient of our Enterprise Computing Award—given annually to the organization that best exhibits excellence in leveraging SAS Institute technology to meet critical business goals.

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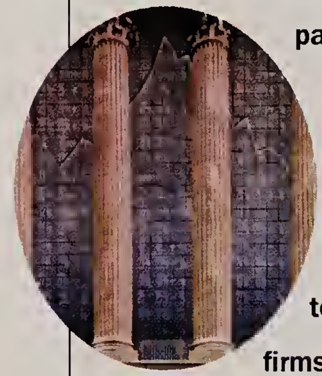
COMMON STOCK

There's nothing like cold, hard cash as a form of compensation, but stock is nice, too. And for corporate board directors nationwide, it's becoming an increasingly common part of the payment package.

According to The Conference Board, a New York-based business organization, 62 percent of the 783 companies it interviewed for its 1995 corporate directors' compensation survey currently use stock options, restricted stock or stock payments in their directors' pay packages. That's up from 55 percent in the 1994 survey, 45 percent in 1993 and 37 percent in the 1992 survey.



Annual salaries, meanwhile, have increased, too: The median was $30,425 in manufacturing firms (up 5 percent from the 1994 survey), $28,125 for directors of financial firms (up 14 percent) and $28,200 for diversified services companies (up 12 percent).

THE HOME-TEAM ADVANTAGE

Work-at-home advocates have long seen the advantages of telecommuting, but bosses wary of losing sight of their employees are not always easy to convince. Now there's some hard data that should help even the most skeptical CFO see the light.

According to a recent study of telecommuting by British Telecom, the average telecommuter puts in 11 percent more hours than his or her office-bound counterparts, reports the Gartner Group. Not only that, but reductions in real estate costs and other expenses save employers an additional 17 percent of annual salary costs.

With numbers like those, sounds like the virtual office is here to stay.

EVENTS

Geographic Technology in Government '95 Conference, Exposition and Datamart
Sept. 5-8
Hyatt Regency, Reston, Va.
GIS World Inc.
970 223-4848

Users from government and industry speak on working with geographic data in turbulent times. The program emphasizes designing creative applications and overcoming institutional obstacles. Sessions include remote sensing, the information superhighway and GIS Internet issues.

Registration: $245-$575

AFCOM '95 Fall Educational Program/ IS Expo Fall '95
Sept. 10-13
Anaheim Hilton and Towers, Anaheim, Calif.
Association for Computer Operations Management
714 997-7966

This conference for IS professionals will focus on automation and current management issues, including the impact of client/server technology and distributed systems, help-desk performance and customer expectations, continuous quality improvement and enterprisewide monitoring.

Registration: $660-$855

HRMS/Expo '95: The National Human Resources Information Technology Exposition and Conference
Sept. 18-20
San Jose Convention Center, San Jose, Calif.
Blenheim NDN Inc.
800 232-3976 or 415 966-8440

Seminars, workshops and case-study tutorials will teach participants about the latest in human resources management and information systems, including client/server technology, payroll and financial applications, training and development, reengineering, HRMS implementation and workflow technology.

Registration: $395-$925

HealthMart '95
Sept. 28
World Trade Center, Boston
Massachusetts Health Data Consortium Inc. and Tufts University School of Medicine
617 890-6040

This annual New England corporate health-care conference and exposition includes sessions on gaining clinician acceptance of computerized patient records and data warehousing as a tool for HEDIS reporting.

Registration: $170

The 1995 Computer Training & Support Conference
Oct. 1-4
Dolphin Resort/Yacht & Beach Club, Orlando, Fla.
Softbank Institute
800 34-TRAIN

Multimedia and computer-based training, online documentation, electronic performance support systems and distance learning are the focus of conference programs. Breakout-session topics include workplace technology (Windows 95 and the Internet), professional development and certification and testing.

Registration: $895

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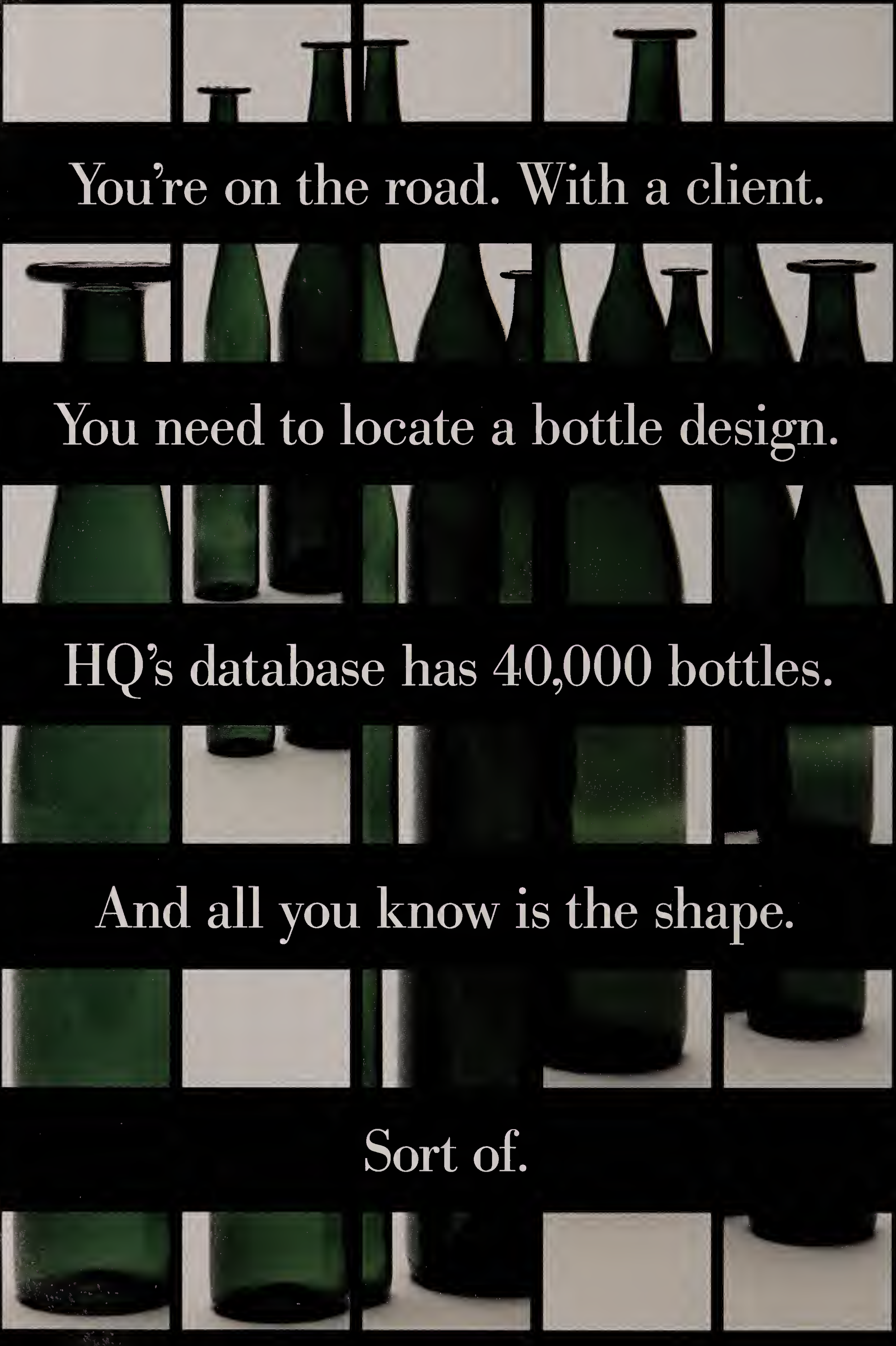
You're on the road. With a client.
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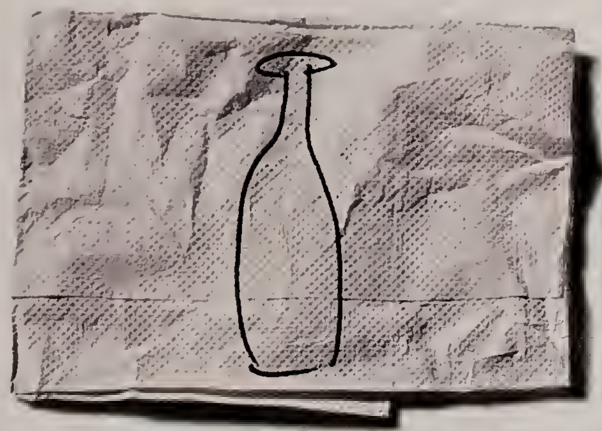
HQ's database has 40,000 bottles.
And all you know is the shape.
Sort of.



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A New Twist

The Helix methodology for improving mission-critical workflows can help companies solve business problems while raising the status of IS

BY MICHAEL R. WOOD

When obstacles develop in a company's path to growth and prosperity, it has two choices: get over those obstacles—fast—or risk becoming mired in problems. For those able to negotiate the course, the rewards can be substantial. Consider the following case studies:

- In an effort to break through a growth barrier, a fabric distribution company wanted to rethink the way it purchased, inventoried and sold its product. After an intense one-year effort, the company implemented an entirely new set of work processes and systems. As a result, it reduced inventory variances from 10 percent to 1 percent a year, increased sales volume by 20 percent, reduced staffing in sales and credit by more than 50 percent, and cut order-to-shipping time from two days to under 24 hours.
- The board of directors of a 140-bed psychiatric hospital believed the institution's future was endangered by its inability to comply with rapidly changing regulations and reporting requirements. The hospital spent six months reengineering the way it processed and cared for patients. The result was a streamlined environment that eliminated redundant work efforts, automated patient records, reduced paperwork and facilitated the production of regulatory and insurance reports.
- A cable-TV provider received notice that its outsourcer was going out of business. It had only six weeks to migrate sales, billing and collection systems in-house or risk losing $5 million in billing a month. Fortunately, the company had conducted a study of its key workflows a year earlier, and so was able to contract for and install a new set of systems within that time period, as well as train staff on them.

All three companies faced threats to their long-term abilities to compete and grow, and all three used the same methodology to solve their problems. That methodology is called Helix, a nuts-and-bolts approach to quickly understanding how mission-critical delivery processes work and how they can be improved. Helix facilitates an organization's ability to define the benefits of improvements in *measurable* terms, secure consensus and support among process operators and owners, define the criteria for success and build momentum for an efficient implementation.

Helix begins with the concept of the organization as a series of value-adding delivery systems rather than departments and divisions. These delivery systems are composed of workgroups drawn from various parts of the organization that share information to achieve a common objective, such as processing orders, purchasing supplies or managing payroll. Understanding how these delivery systems really work is critical to improving them.

Typical process-improvement projects work through traditional organizational charts, asking employees from shipping, purchasing and accounts payable for ideas independent of one another. Such efforts fail to identify customers and suppliers and never examine how people really

ILLUSTRATION BY CHRIS GALL

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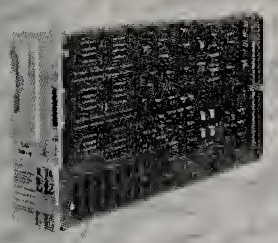

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work together. Helix, on the other hand, relies on delivery-system or workflow teams that represent a company's knowledge base about the processes it hopes to improve. In a distribution company, for example, the sales process would be analyzed by line workers from marketing, the sales/order desk, credit, warehouse/shipping, billing and collections. Once a shared understanding is achieved, the improvement process becomes faster and easier.

At first glance, Helix has much in common with joint application design (JAD). But it delivers far more dynamic results in terms of building cross-functional rapport, organizational awareness and process improvements. Helix projects, which usually take between one and three months to complete, typically produce ROI results of 50 to 800 percent. In addition to providing long-term benefits, they often allow immediate, low-cost improvements to be identified. These "low-hanging fruit" frequently underwrite the cost of the team's efforts.

Helix projects are generally facilitated by a representative of IS. This enables IS to learn how the business works while helping team members understand how technology can make the process more productive and efficient. In addition, because any workflow improvements will probably affect IS, participation in a Helix project gives the department early information necessary for a successful requirements-definition and data-modeling effort.

Helix projects kick off with two work sessions designed to provide a framework for focused collaboration and accelerated learning. Participants develop a series of models that help them analyze existing workflows. They begin by looking at the current situation, focusing on problems and opportunities for improvement. The "bad" is defined in quantitative terms: what goes wrong, how often, at what cost and under what conditions. Next, the team sets a preliminary goal, which basically describes the improvements it hopes to implement. Here, the focus is on the "good," which is defined in terms of what should happen, how much it will cost, how much it will save and the benefits it will achieve. Through this effort, team members align their expectations about acceptable changes and improvements.

Helix relies on delivery-system or workflow teams that represent a company's knowledge base about the processes it hopes to improve.

The next step is to provide a simplified "big picture" of the delivery system, identifying who participates in the workflow, the information they must share and the sequence in which workgroups communicate. Team members clearly state the goal of the workflow, as well as any assumptions about the circumstances necessary for its successful completion (i.e., the customer has credit; the product is in stock).

At this point, the team also identifies primary "objects"—such as orders, shipments, invoices or payments—so that changes to their status become readily discernible. Participants then break down the workflow into "phases" based on the primary object's transformation as it moves from the beginning to the end of the process. (For example, an order begins as an open order and becomes in turn an approved order, a shipped order, a billed order and finally a paid order.) Team members evaluate actions based on what they add to the primary object's progress and examine changes to secondary objects, such as customers and inventory.

Once they have synthesized their ideas for improved workflow models, team members check them against the original analysis to make sure all problems have been addressed. They also test the new models for possible breakdowns or failures and, if found, refine or rework them.

After each work session, the facilitator and a support analyst perform a series of diagnostic procedures, reviewing each model for completeness and general business sense. For example, they check to see that existing problems are quantitatively defined in terms of cost, service levels, morale, etc. Subjective phrases ("too slow") are replaced with objective measures ("It takes eight hours to..."). They then refine the group's preliminary goals in a similar manner.

The post-diagnostic procedures make sure that the proposed workflows are as efficient and airtight as possible, and that they address the problems raised in the initial analysis. Finally, the team compiles a list of inputs, processes and outputs for use in the implementation. The list represents a net view of the requirements for change in the proposed workflows and should be useful in the requirements-definition phase of any subsequent development project.

The results of these diagnostic efforts form the basis for the final work session, in which participants perform a "walk through" of the new workflows, looking at goals, benefits, costs and a timetable for implementation. They then package their findings into a proposal to management. This proposal describes measurable, objective performance benefits that can be realized by taking the recommended steps, along with time lines, effort levels and costs. Because returns on these projects are so high, they are virtually always approved.

What do participants take away from a successful Helix project? IS, as the project facilitator, gains a new reputation as a legitimate change agent. The project team is recognized for its ability to identify opportunities for improvement and act on them. And the company benefits from better performance. Everyone wins. CIO

Michael R. Wood, who created the Helix methodology in 1977, is vice president of MIS for the Ventnor, N.J.-based Showboat Operating Co., which builds and manages casinos. For a more detailed description of the Helix methodology, call Wood at 609 487-2077.

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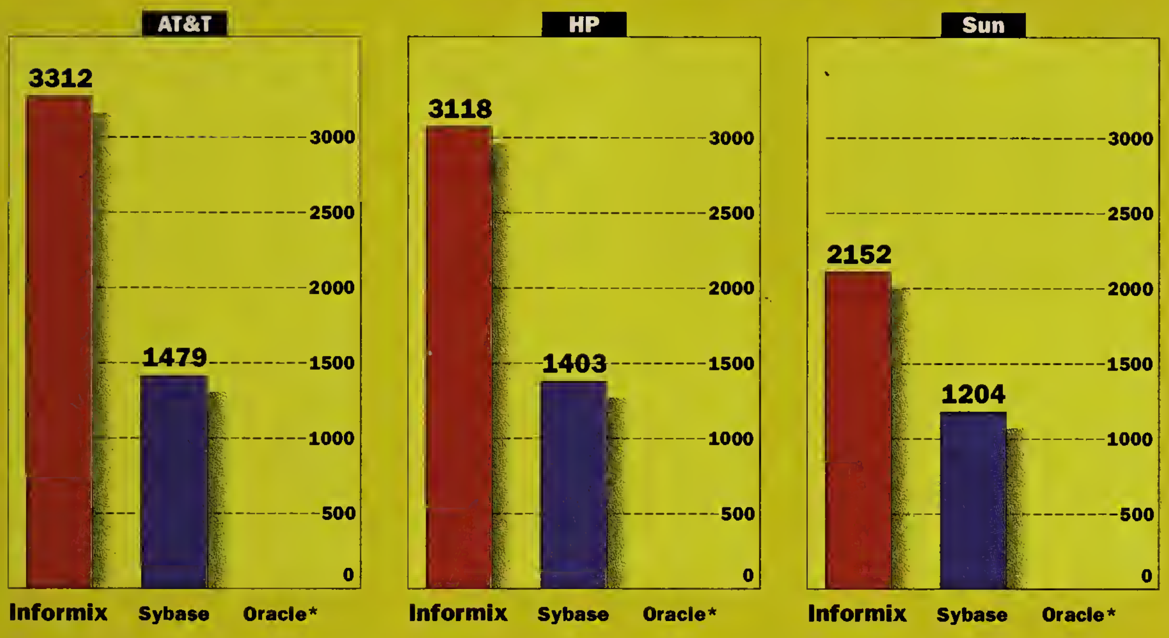

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*Oracle has not submitted TPC-C performance numbers.

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Hold Onto That Turf

The battle for control of the company's Web site has begun, and IS organizations that don't make themselves indispensable fast risk being pushed to the sidelines

BY JIM STERNE

A quiet tapping at the doors of industry revealed a small, cute, Trojan bunny rabbit named e-mail. E-mail was friendly, helpful and courteous, and it was let in for the night.

By the next morning, e-mail had produced an offspring. Gopher had arrived on the scene with a barely audible "ftp!" As IS endeavored in its dutiful way to provide for these creatures, it was blindsided by a horde of marketing managers fostering a colossal craving for something called the World Wide Web.

While you were sleeping, the world was engulfed by the Internet.

Let me tell you a story. This is your story. It relates the discovery of the Internet and the Web by your own staff. It tells of the gleeful creation of home pages by technologists, who haven't had this much fun since the original Adventure game showed its command line interface on CP/M systems everywhere.

This tale describes the marketing department greeting the technologists' wizardry with awe and delight. But their initial enthusiasm is followed swiftly by shock. These executives—some of whom have spent years in school learning the difference between marketing communications, public relations and advertising—suddenly realize that the whole world can see the company's technologists making a mockery of corporate identity and product positioning. They are upset.

ILLUSTRATION BY JAMES ENDICOTT

Sensing the urgency of the situation, the marketing executives make blindsiding their corporate maneuver of choice. They begin the battle for ownership, and they win. They can't configure a Windows machine, much less understand the requirements of a TCP/IP connection, but they now own the company's Web site.

Your department now faces an interesting problem. After fighting to retain control, you aren't needed anymore. Marketing has its own budget and is able to go out into the world and find third-party vendors to house a server and run the site.

How, then, do you keep this new, exciting technology in IS? How do you reassure your best and brightest that they can continue being the keepers of the keys of technology? Much more important, how do you prove (once again and every day) that IS is the heart and soul of the corporation? How do you prove that it is full of the spirit of teamsmanship?

First, remember that IS is a service organization. What did you do when accounting discovered spreadsheets? When product development discovered CAD/CAM? When marketing discovered desktop publishing? You offered help, advice and support for the technology—not the content. Time to do it again.

Here are some suggestions for how IS can help the marketing mob and, in

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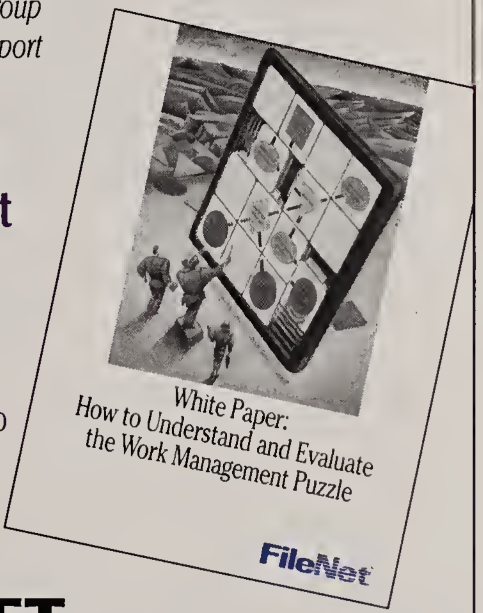

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the process, earn its gratitude, its affection and its budget.

1. Explain the Internet. If marketers are going to create corporate-sized Web sites and ask IS to maintain them, they had better understand what they're up against. They are going to go out on the Web and see thousands of sites and expect you to accomplish overnight what others have taken months to create.

Content providers don't need to know a WinSock from an X.25. But they do need to understand the limitations of bandwidth. "At what speed are the people you wish to visit this Web site connected?" you might ask them. If you get blank stares in reply, ingest two more aspirin and encourage them to survey their current customer base for the answer. Then explain the difference in experiences for a visitor using a multimegabit fiber connection and one with a 14.4 dial-up modem.

It is also important to make sure they understand enough about client/server and the limitations of hypertext transfer protocol (HTTP) to keep the outrageous requests to a minimum. Help them grasp that Web surfers are interested in content and feedback, not electronic brochures with lots of pretty pictures and a video of the CEO welcoming the world to your site.

2. Give Them the Tools. The Internet generates new tools faster than a 7-year-old brings home colds. There is a variety of software available, free or on trial. If you're not careful, marketing staff will download new versions of editors and image converters daily and blame you when you can't make them work.

In this case, the best defense is a good offense. Assemble a suite of hypertext markup language (HTML) tools and WYSIWYG page tools and create a few classes in their use. Become the purveyor of the technology and you may be able to assert control over which should be used.

3. Help Them Create a Style Guide. Marketing people probably understand the need to have a stylistically integrated Web site. But they'll need your help determining the principles of content style. Certain technical considerations will limit a Web site's character. Certain choices (colors, graphics, file size, forms processing) will allow for tool standardization. As a result, it will be easier to train and support those charged with the creation of content.

> **IS should act solely as a printer—that is, faithfully reproduce whatever the client desires—as opposed to a publisher, who must consider all aspects of content.**

4. Create a Procedure to Follow. Content must be analyzed for format, technical accuracy and spelling. There are also questions of a decent response mechanism; if the site gets a great reaction from the public, is somebody assigned to answer the mail? While this, too, should not be the responsibility of IS, you should lend a hand in setting up the review process. What are the steps for approval? Who are the gatekeepers? What committees must sanction the content prior to submission for server staging? There's no need for Machiavellian constraints here, just a nice, logical flow to assure that others have checked the i's for dots and the t's for crosses.

Such a process allows IS to act solely as a printer—that is, to faithfully reproduce whatever the client desires—as opposed to a publisher, who must consider all aspects of content. It is the editorial task that marketing people live for, and you should leave it in their hands.

5. Establish a Test Suite. Content providers may not understand the need to test their creation on a routine basis. They will therefore depend upon your organization to know that links between pages must be tested after every update.

Automate where you can to ensure that your server is online, links are still legitimate and data collection is working. Should your Web pages point to outside sources (cooperative-marketing partners, third-party value-added resellers or even the automatic stock-charting system at MIT's AI Lab), be sure they are checked daily. Yes, you are now responsible for change-tracking on other people's servers. Page been removed? Company bought out and the server renamed? Anything that gives the user back a 404—File Not Found—is now your problem.

6. Get Ready for Tomorrow. When all of this is done, you might actually be prepared for the day (tomorrow?) when this infant technology hits adolescence: that time when the hormones kick in, the clothes no longer fit and the demands have less and less to do with sound reasoning. You will know that time has come when the CEO agrees with the head of marketing about giving customers access to back-office information. ("Client/Server Computing on the Rampage! Millions of Customers Gain Direct Access to Corporate Computing!!")

Yes, the World Wide Web is in its infancy. It will mutate frequently, but it can be taken to its logical extreme. In the competitive world of tomorrow, your customers will demand instantaneous intelligence re: the status of their orders, the amount of stock on hand and the estimated time of delivery. Ubiquitous EDI and a terminal on every desk. The company with the most freely available data wins.

So, as you contemplate building relationships with the VPs of marketing and communications that are on a par with your relationship with the CFO, remember that they will need you more and more in the days to come. Be ready for them. CIO

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*Jim Sterne is president of Target Marketing of Santa Barbara (*jsterne@targeting.com*). His book,* World Wide Web Marketing *will be available from John Wiley & Sons this fall.*

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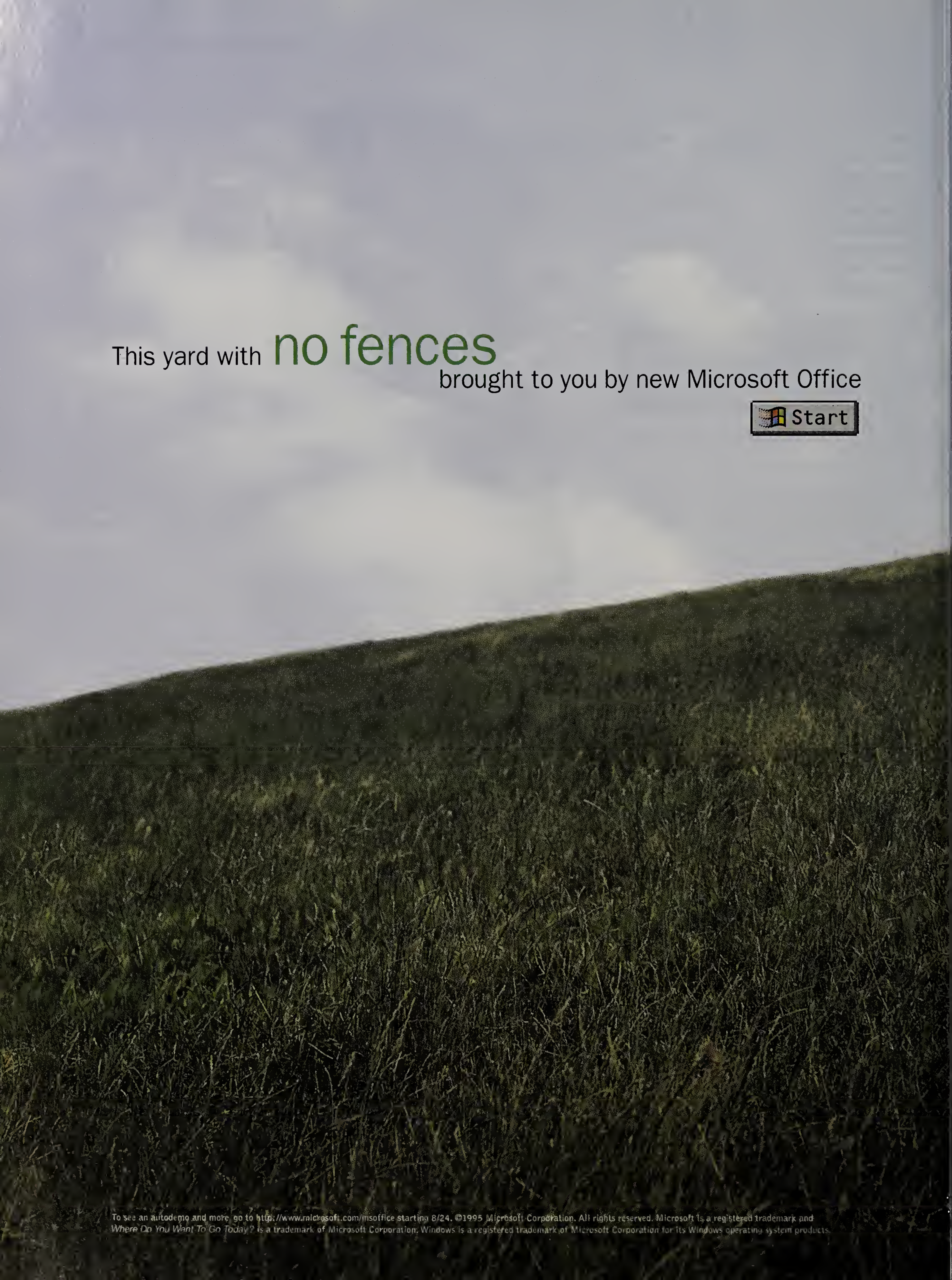
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GLOBAL MARKET *Scents*

BY PETER FABRIS

THE GLOBAL ENTERPRISE

When Avon Products Inc. was founded 109 years ago, its sales staff peddled its wares in just one region of the United States, going from house to house in the Northeast. Today, Avon ladies are a United Nations-like sales force calling on customers in more than 120 countries. Expansion into emerging markets, which are growing faster than established economies in the United States, Canada and Western Europe, is a high priority for this decade. In 1994, developing countries such as the Philippines, Malaysia, China, Poland and Hungary generated $1.56 billion, or 37 percent, of Avon's total $4.27 billion in sales, which translates into $282 million, or 49 percent of the company's pretax profits.

Avon's door-to-door direct sales strategy is especially well suited to nations with undeveloped retail infrastructures. Unreliable transportation, inadequate storage facilities and limited advertising vehicles make retailing as we know it in the developed world nearly impossible in many emerging markets, particularly in rural areas. Nonetheless, demand for quality Western cosmetics, jewelry and clothing is high nearly everywhere. Furthermore, the opportunity for women to start their own businesses is attractive to many in emerging countries, a key driver of Avon's growth in these regions. All of these factors are expanding Avon's horizons each year.

According to Ron Mastrogiovanni, senior vice president and chief information technology officer, the company's global expansion requires integrated and, as much as possible,

IN THAILAND *and other parts of Southeast Asia, Avon's salesforce takes advantage of local distribution channels.*

PHOTO COURTESY OF AVON PRODUCTS INC.; PHOTO (FAR RIGHT) BY KENT HANSON

STORYLINE

Those of us who grew up with the image of the "ding-dong, Avon calling" lady of the 1950s and '60s may find it incongruous to imagine this salesforce being deployed to parts of Southeast Asia in wooden canoes. But emerging markets now account for almost half of Avon's pretax profits. While the demand for Western goods is high just about everywhere on the planet, companies that depend on robust retail infrastructures—transportation, storage, advertising—face many obstacles. It's a situation tailor-made for Avon's direct-sales strategy. But Avon's ability to thrive in these untested markets depends on having excellent management, analysis and reporting tools. That's where its globally integrated financial strategy comes in.

RON MASTROGIOVANNI: *Avon's global financial system is critical to the company's strategic vision.*

standardized financial systems that are effective operation management tools, not just tools to create profit-and-loss statements. And these systems must be flexible enough to adapt to local-market business requirements.

JAMES STRUTT *keeps a close eye on the implementation teams so he can identify potential bottlenecks before they become a problem.*

PHOTO BY KENT HANSON

The first stage of Avon's global financial systems plan is currently underway. The company is rolling out Avon Standard Accounting System (ASAS), a global financial transaction and reporting system, at 40 sites around the globe. Implementation began in June 1994 in Canada, followed by Germany and Mexico. The project is scheduled to conclude with U.S. implementation within 18 months.

This step is crucial to the execution of the company's strategic vision, according to Mastrogiovanni. "This standardized transactional system provides the vehicle to easily and consistently capture the critical information needed to make both strategic and tactical decisions for growing the business," he says. When it is combined in the future with data warehouses to store key financial and operational information, managers will have the ability to examine sophisticated business metrics both on the local level and on a global scale. For example, a manager in an emerging market may want to compare the average sales per representative of a new clothing line with the same statistic of similar product lines. Using such sophisticated metrics will help management track findings over time and compare them with previous results.

For Avon, the challenges of achieving a global finance strategy are daunting. Until recently, the company had one financial reporting system at corporate headquarters in New York and a hodgepodge of manual and computerized systems at its foreign sites (incorporated units in 40 countries and independent franchises in about 80 others). Even though the nature of the company's business is universal, accounting needs are not, says James Strutt, assistant corporate controller, who is spearheading the ASAS project. Avon's foreign entities operate with a fair amount of autonomy. Before current standardization efforts, routine functions such as cash-flow reporting methods could vary from region to region. Foreign offices often have two sets of books—one primarily addressing local regulations and the other for corporate reporting—a practice requiring translation from one set of books to the other.

The Avon Users Group offers a companywide bulletin board dedicated solely to the project. It has been a lifeline for all sites, providing a vehicle for sharing tips to make implementation go more smoothly.

Tax structures, because they vary greatly throughout the world, present hurdles for designers of standardized global systems, too. In the United States, for example, corporations must track income and sales taxes. Many European countries, on the other hand, have a value-added tax system with levies on business transactions throughout the manufacturing chain. Different tax regulations mandate different record-keeping methods and charts of accounts. Sometimes tax laws vary even within nations. Brazil, for instance, one of Avon's fastest growing markets, has over 200 different district and regional taxing bodies, each with its own requirements, so Avon must customize its financial systems to address all of them.

Avon knew that a standard global financial system had to be flexible enough to handle these widely divergent tax and accounting requirements, but it also had to have standard interfaces from accounting to financial reporting charts of accounts to allow corporate headquarters to do apples-to-apples financial analysis.

The system now being rolled out provides a prototype that can quickly be modified for new markets and allow for local modifications according to tax and accounting regulations, currency conversion needs and language differences. Rather than develop its own system from scratch, Avon chose Integrated Accounting System by CODA Inc., based in Harrogate, England, and with U.S. headquarters in Manchester, N.H., to form the core of ASAS. Running on the IBM AS/400 platform, the sys-

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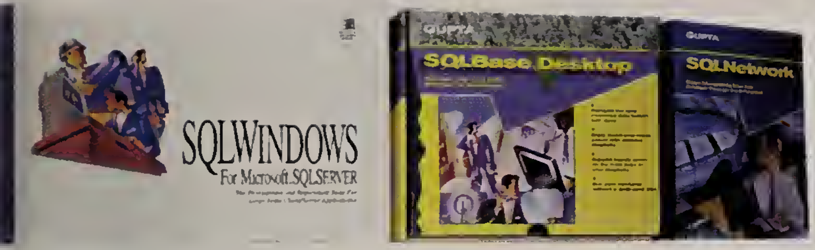

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tem incorporates general ledger, accounts payable, accounts receivable, project accounting and other reporting functions with an embedded, unified financial database.

Accountants record local accounting data on local charts of accounts and tables embedded in the CODA software that automatically translate data from local to standard corporate reporting charts of accounts. Foreign sites transmit financial data to corporate headquarters in New York via the Quik-Comm network. Each individual business unit is free to create individual subaccounts, but they are all generated from one overall chart of accounts. Tax laws and corporate reporting requirements are often modified from year to year, so the system's ability to accommodate modifications to these tables without IS intervention is another plus.

The rollout of the system to so many remote locations has required detailed planning. A corporate task force, consisting of financial managers from a number of countries as well as corporate financial and IS staff, conducted a global study of the company's financial requirements—regulations, taxes, charts of accounts and the like—for each country and region, and from there defined the system's requirements.

A corporate implementation team oversees 35 or more divisional teams led by a few key local finance personnel. The corporate team, headed by Strutt and consisting of about 12 people from financial systems and a half-dozen technical support people from IS out of the Manhattan corporate office, developed a prototype plan first employed in Canada and now used at each new location. "We have a well-defined cookbook" that provides the basic plan with allowances for the needs of individual sites, Strutt says.

It's vital that each location embraces the system, "otherwise it's not going to work," says Strutt. To encourage local acceptance (and avoid the appearance that outsiders from corporate headquarters are imposing a sweeping new system), Strutt has made local financial directors responsible for the implementation teams' success in their countries. Strutt keeps a close eye on weekly progress reports and other communications from local teams and his own implementation team to identify potential bottlenecks early. "These implementation efforts can get away from you unless you know what's going on at all times," he says. He looks for problems that could arise again at other sites. For example, he noticed that departments in different countries have different formulas for allocating expenses. In response, he established a common database containing these formulas so all sites will have access to them.

On average, implementation at

PHOTO BY MARK KATZMAN

So You Want to Be an International Financier

Monsanto and other companies are learning the arts of international finance, performing global cash management and pooling their funds for lending among foreign divisions without incurring currency exchange rates

The new world economic order encourages global trade on a scale never seen before and promises greater prosperity for many companies. In order to operate globally, however, organizations must overcome significant logistical challenges. Among these is managing transactions and asset holdings in a number of different currencies. This can be a risky task with currency markets as volatile as they've been in recent years.

The value of transactions—purchases, sales, loans, investments and the like—can change significantly due to the vagaries of currency markets over which companies have no control. Currency values can rise or fall with little warning based on the soundness of national economies, trade surpluses or deficits, interest rates and even the whims of global currency traders.

Monsanto Co., headquartered in St. Louis, reduces its exposure to unfavorable currency fluctuations by closely tracking its worldwide cash flows, assets and liabilities each day. This capability is essential for effective multicurrency treasury management. For example, the diversified chemical, pharmaceutical, agricultural and food-ingredient products company recently increased its borrowing of Japanese yen to take advantage of low Japanese interest rates, according to Juanita Hinshaw, vice president and treasurer.

This strategy could be extremely risky if Monsanto had to pay back these Japanese loans in U.S. dollars. The company might end up paying much more than the original amount plus interest if the value of the dollar plunged against the yen after the loan was made. Monsanto must therefore borrow only as much as it anticipates it can pay back in the same currency.

It is able to do this for two reasons. First, it has significant sales in Japan. "We have natural sales flows to offset our exposure," Hinshaw each site takes about nine months. The first three are dedicated to planning and installing equipment, the next six for the actual software installation and subsequent training. John Owen, formerly Avon's vice president of finance for Canada who was recently named a global finance director at the company's corporate headquarters, reassigned his financial accounting manager and two other financial professionals to the project implementation full time. "Obviously, we were short-staffed for a while, but we felt it was the only way we could do it right," Owen says.

The Avon Users Group, formed by finance personnel, offers a companywide bulletin board dedicated solely to the project. It has been a lifeline for all sites, providing a vehicle for sharing tips to make implementation go more smoothly. Six dial-in lines at corporate headquarters are dedicated to the bulletin board. This is especially useful for Asian sites, which would be unable to contact New York headquarters during normal business hours because of the time difference, Strutt says.

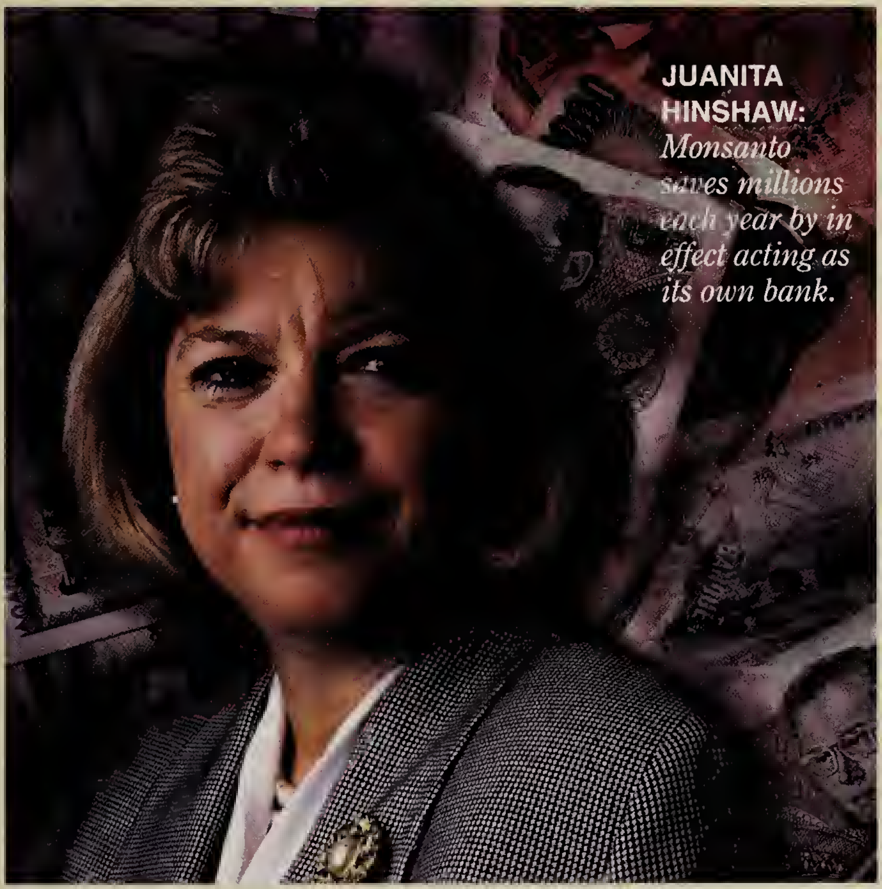
With Avon implementing the system in 40 countries, Strutt's team had to make sure its implementation

says. And second, it tracks and manages its cash in real-time. One of the tools that enables it to do this is a globally oriented cash-management system developed by Citibank. Monsanto uses PC links to tie into the "Citibanking" system, a multiplatform mainframe system connecting 94 sites via a private global satellite network. Using this system as a conduit, Citibank can analyze Monsanto's cash transactions to identify regional cash-flow patterns.

Monsanto also does global cash pooling. Participating Monsanto entities place their surplus cash into a pool each day. An entity needing cash can borrow from this pool. The system currently accommodates 27 Monsanto entities in 10 countries using 12 currencies.

This cash-pooling strategy, which works best for companies in which there are both positive and negative cash positions among many subsidiaries, according to Hinshaw, works both for offices within one country and among offices in different countries. If, for example, the Brussels office needs to pay a bill to a German vendor in deutsche marks, it can borrow a German office's surplus marks from the cash pool so that a bank currency exchange is not necessary. Without this system, many Monsanto entities would have to convert currencies frequently, incurring a bank fee each time. By acting in effect as its own bank, Monsanto saves approximately $2.5 million a year on short-term borrowing fees, currency management costs and other charges.

One of the most impressive parts of Citibank's system, according to Bob Westoby, Monsanto's director of cash management and currency, is its ability to automatically track interest debits and credits for Monsanto entities worldwide. This ensures that the entities are automatically credited with interest on a cash surplus (and at market rates), even when part of the surplus is lent out to another office. They are likewise charged interest when they borrow.



JUANITA HINSHAW: *Monsanto saves millions each year by in effect acting as its own bank.*

Global cash pooling is becoming more common today for several reasons, says Jean Van den Brande, based in Brussels, who manages Citibank's cash-management markets for Belgium, the Netherlands and Luxembourg. More sophisticated IT, such as electronic data interchange systems, have enabled real-time global cash-management capabilities. Additionally, restrictions on the movement and management of currency across borders have eased in many regions, particularly in Europe, where "they have all but disappeared," he says. Restrictions remain in many other regions, prohibiting companies like Monsanto from fully pooling cash worldwide, but the trend toward lifting these rules is gathering momentum.

As a result, many companies have set up regional cash-management operations. For instance, Monsanto's treasury operation in Brussels oversees European cash transactions. Because Brussels is conveniently located between Asia and company headquarters in St. Louis, the Belgian finance center is becoming a "focal point" for the company's global cash-management operations, Hinshaw says. And because its business hours overlap with late afternoon in Asia and morning in the United States, it can act as a same-day intermediary between the two regions.

–P. Fabris

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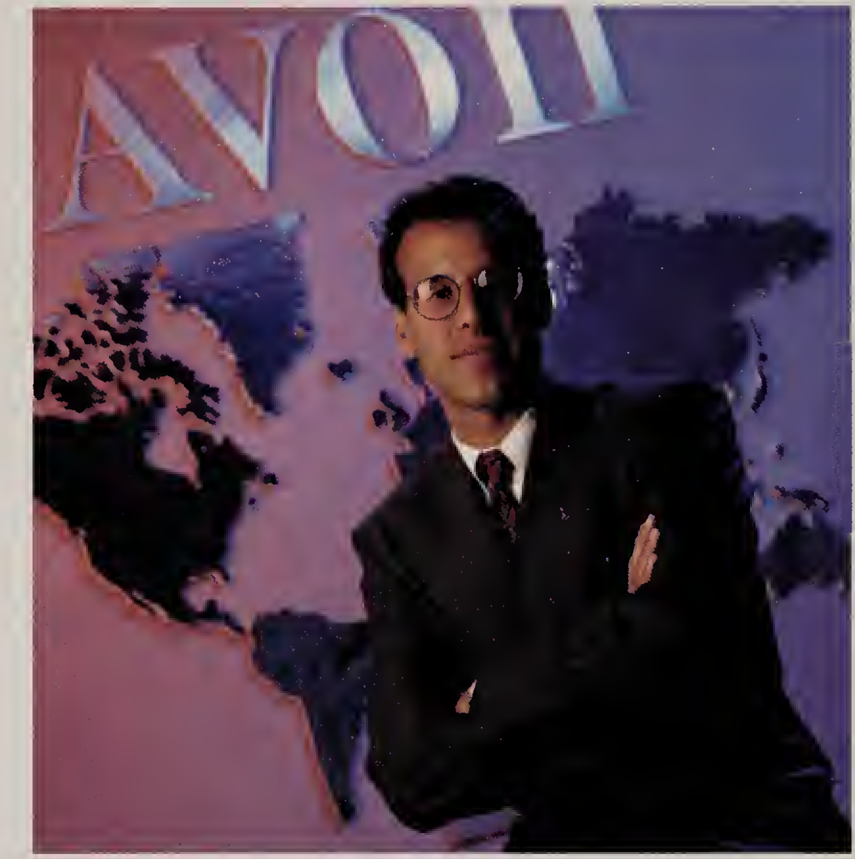

JOHN OWEN: *Regional offices have achieved significant savings in some not-so-obvious ways.*

plans and various technical manuals were translated into local languages. "If you're a global company, you can't push English all the way down on the staffs [in other countries]," he says, although English is necessary as a common language for corporatewide communication. To facilitate communication on this and future projects, Strutt has hired personnel who are fluent in Korean, Chinese, Portuguese, Spanish, French and several Indian dialects.

Another barrier to standardized global rollouts is that technical expertise varies from country to country. Avon tempered its approach by standardizing on the AS/400 instead of the latest whiz-bang client/server hardware because too many regions do not have access to the technical skills to support the newest technology. Given the spotty support available in some areas, "AS/400 at this moment is client/server enough for us," Strutt says.

Corporate IS has a lot of personal contact with local business units, particularly during system rollouts. Many IS staffers are on the road nearly 100 percent of the time, Mastrogiovanni says. His staff also holds frequent teleconferences at all hours of the day with management, functional users and systems implementation suport staff to address problems and offer continual support. "We don't just say, 'Here's the toolkit, now adios.' Our success is based on effective communication, trust, commitment and collaborative teaming."

Having a standard worldwide financial system facilitates Avon's global strategy in many ways. Avon likes to transfer financial personnel to different regions periodically to give them a more global outlook of the business, says Strutt. "We can move people around with the confidence that they'll be productive [faster]," he says, because they don't have to learn a new financial system.

Having a common worldwide system will also make it easier for the company to measure its internal best practices and implement them worldwide, Mastrogiovanni says. If, say, a German office is best at an accounts payable procedure, it will likely be easier to implement that practice in all other countries once the company has one standard accounting system than when it had many different ones.

> *"We don't just say, 'Here's the toolkit, now adios.' Our success is based on effective communication, trust, commitment and collaborative teaming."*
>
> *–Ron Mastrogiovanni*

Locations previously saddled with antiquated systems have automated some tedious manual tasks. For example, in Mexico, accounts payable staff used to type out checks by hand. On one visit south of the border, Strutt was amazed to find vendors patiently waiting at Avon's Mexican headquarters for their checks to be cut. That's no longer the case. The new system has enabled many locations to use electronic funds transfer to pay bills. Strutt says that about 40 percent of Mexican vendors can now complete transactions electronically with Avon.

Some regional offices achieved significant savings in some not-so-obvious ways. For example, Owen's staff, equipped with a new, unified reporting system, eliminated many batch updates that were required by the old mainframe system. As a result, the Canadian office saves $21,000 a year on computer paper alone since mainframe batch processing was eliminated.

While offering many benefits, automation also causes some "cultural shocks," Strutt says. Accountants are extremely meticulous by nature, so convincing them that they can accurately keep the books more quickly with fewer steps isn't easy. Becoming comfortable with the new streamlined methods took some adjustment.

As Avon continues to build its global financial systems, more employees will likely find these IT tools indispensable. Avon's dedication of resources to this project so far is indicative of its importance to the company's future. When growth depends more and more on penetrating new markets, from former Communist strongholds in Eastern Europe to remote villages in South America and Asia, effective and efficient global financial data gathering and analysis is vital.

PHOTO BY KENT HANSON

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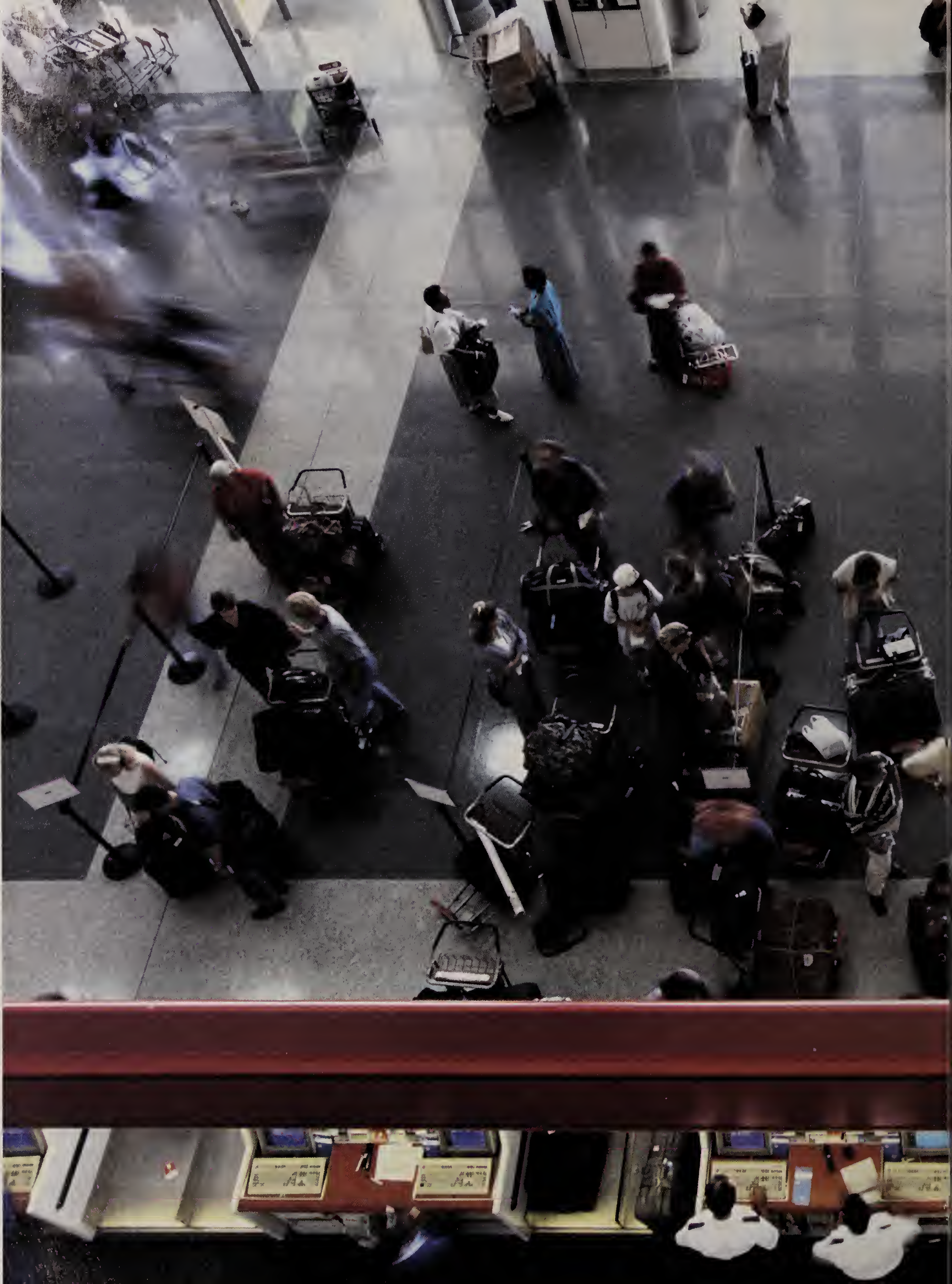


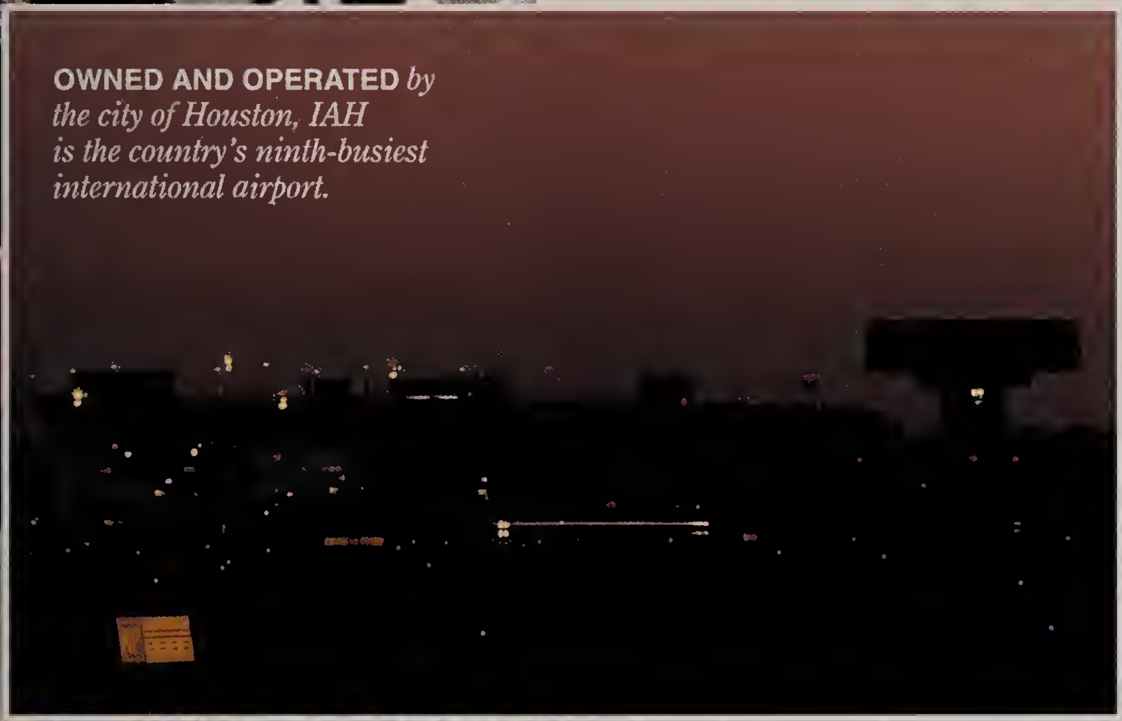
Airport '95

Far from the buzz of Denver, airports like Houston's IAH are setting a course for unspectacular but effective IT that gets the job done without busting the budget

Part One

When it comes to air travel, getting there can be half the fun. But for many travelers, getting there can be no fun at all. It means getting there while their luggage goes someplace else. Or getting there late. Particularly when it comes to business travel, most trekkers would gladly settle for a journey that is simply "routine." But how many ever stop to think about what it *really* takes to get there?

BY TRACY MAYOR



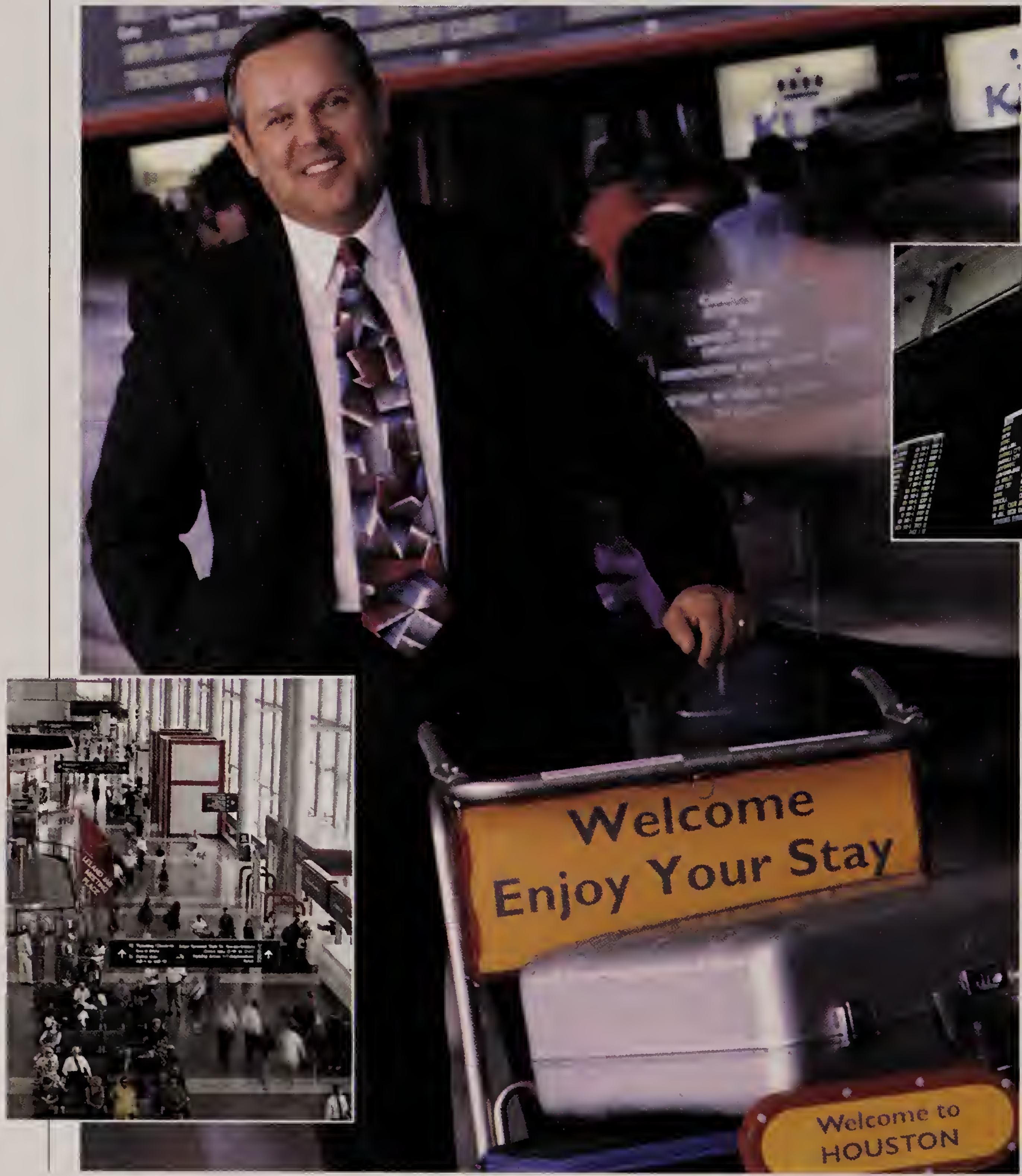
OWNED AND OPERATED *by the city of Houston, IAH is the country's ninth-busiest international airport.*

PHOTOGRAPHY BY ROCKY KNETEN; ICON BY MARK FISHER

Consider the Chicago businessman returning from Mexico City. His plane touches down 20 minutes ahead of schedule for a layover in Houston and taxis to the gate. He deplanes (as they say in the industry), breezes through Immigration, follows the signs to retrieve his baggage, sails through Customs with no problems and checks the video display for info on his connecting flight home. With 40 minutes to spare, he finds a pay phone, calls the office, grabs a slice of pizza, stops by the restroom and still has time when he gets to the gate to upgrade his seating assignment with the airline attendant.

To the nearly 1,300 employees of Houston Intercontinental Airport (IAH), that brief stopover represents a successful operation of a web of systems and departments to ensure that every aspect of airport operations runs smoothly. Most people expect the FAA—and for international flights, Customs and the Immigration and Naturalization Service—to be a part of their jaunt, but few are aware of the myriad other systems that oversee everything from federally regulated security systems to lavatory cleaning schedules. In the case of the Mexico-to-Chicago flight, various airport systems pre-cleared certain passengers through Immigration, tracked the early arrival of the plane and ensured that personnel were in place at the baggage carousel ahead of time, gathered arrival and departure information from some 20 separate airlines to display in an alphabetical sort for easy viewing, and provided a fast, reliable fiber-optic connection that lets attendants check frequent-flyer records on the spot.

JAMES FRASER *faces the challenge of mixing the airport's old technology with the new.*



Behind those systems in Houston is a surprisingly small but nimble IS division, a results-oriented management team and a hefty dose of systemwide pragmatism. James Fraser, manager of the Aviation MIS (AMIS) division, starts many discussions with the phrase, "If we could dig a hole in the ground and start over...," a wistful reference to the built-from-scratch Denver airport that elicits envy from many in aviation.

Actually, Houston did get its chance to build one new hole in the ground: The Mickey Leland International Airlines Building (IAB) opened in 1990, and the building's IT-enabled innovations still draw a steady stream of fact-finding airport managers from around the world. But the technologically superior IAB runs alongside three other domestic terminals—A and B, which date from 1969, and C, which opened in 1981—that support a wide range of technology, some of it downright aged. Even so, the older terminals represent the bulk of IAH's traffic and its revenue. In particular, Terminal C, leased entirely to Continental Airlines Inc., which expanded its hub and established its headquarters in Houston in 1982, handles 75 percent of all traffic that passes through the airport.

THE AIRPORT *requires automation for everything from flight information to concession tracking and construction tasks.*

This mix of the old and new presents challenges to AMIS, but, says Fraser, it also helps keep innovation in perspective. "We have to stick out our necks or we'd never get anything done, but we don't have to be first with every new technology," he says. "Lots of times, we don't even want to be first. We just want what works."

The advance planning of the RFP process makes managers less apt to have technology "emergencies" in the middle of the year and more likely to plan for new equipment or systems.

For all his modesty, Fraser's AMIS division has constructed an array of automated systems that would overfill most IS managers' plates. The city of Houston owns and operates IAH, the ninth-busiest international airport in the country, along with two smaller airports within the city limits. All three are operated by the city's Department of Aviation (DOA), with Fraser's AMIS division taking full responsibility for nearly all aviation-related technology (some functions, such as payroll, are centralized downtown).

In addition to standard business applications such as budgeting, records management, rates and charges, warehouse inventory and purchasing, the airport requires automated systems for managing flight information, security access control, ground transportation, paging/information, airfield lighting, radio maintenance, vehicle maintenance, parking, concession tracking, and a wide range of planning, design and construction tasks, including pavement analysis, construction billing and grant management.

In addition to the multiple standalone systems in the field, AMIS also presides over 12 LANs encompassing some 400 workstations; an Amdahl Corp. mainframe running MVS; and four Stratus Computer Inc. minicomputers, two of which reside in a cold room in Terminal A and run the airport's most crucial safety and scheduling systems. Every networked computer runs Higgins, an e-mail, calendaring and scheduling program from Enable Software Inc. in Ballston Lake, N.Y. Fraser says the program, which he acknowledges is a somewhat obscure choice, works well because everyone from Aviation Director Paul B. Gaines on down uses the system to schedule every meeting and every appointment. "We fell in love with it, and we certainly use the heck out of it," Fraser says. Airport employees also use PCs, the majority of which are 386 machines, to run standard business applications such as WordPerfect, Lotus 1-2-3 and Paradox, primarily under DOS rather than Windows, as well as some 220 custom programs developed by Applications Manager Myrna Gonzalez and her staff of programmer analysts.

"We encourage our users to approach the AMIS programmer analyst in their own group to request changes or modifications or the creation of a brand-new system," Fraser explains. "With the department involved from

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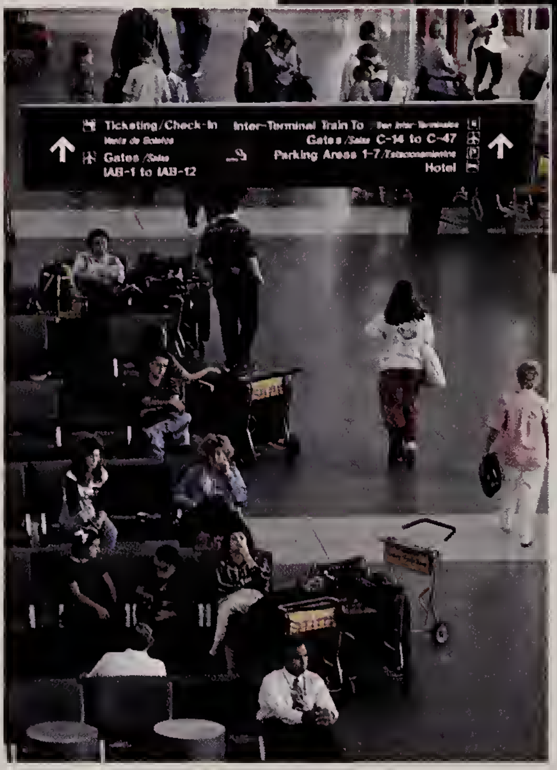


OUTSOURCING *various airport maintenance services in such areas as transportation, telecommunications and baggage systems is a way to return jobs to the community and keep staffing to a minimum.*

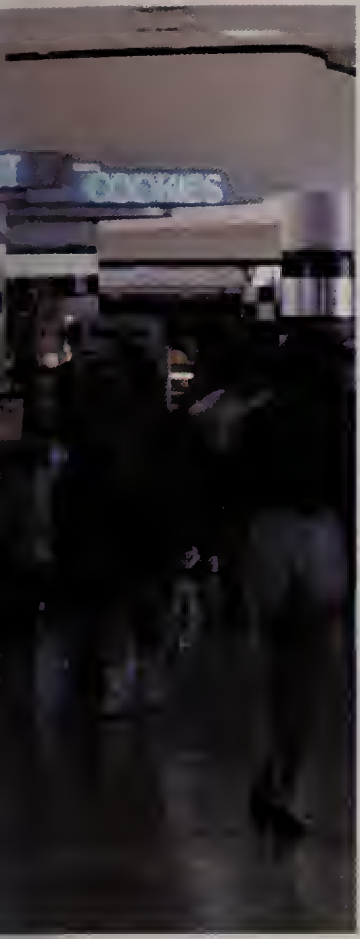
the very beginning, there's a lot less unhappiness with the final project." Programming primarily in the FoxBase development language, Gonzalez's staff writes applications for everything as diverse as emergency preparedness event tracking, monthly fuel delivery reports and taxicab trip logs.

One way the Department of Aviation and AMIS stay on top of so many simultaneous operations is to offload certain airport services to private companies. The city of Houston municipal government suggests the use of contractors and outsourcing as a way to return jobs to the community and keep staffing to a minimum. "We really believe strongly in using the private sector to get specialty support services," Fraser says. "We're budgeted for 1,300 employees between the three airports, which is a very low number for all the services and activities that are going on." As a result, services such as heating/ventilation/air conditioning (HVAC), jet fuel, baggage-system maintenance, vehicle maintenance, jet bridges, LAN servicing and cabling, and telecommunications maintenance are contracted to third parties. That still leaves the DOA with responsibility for the most critical airport systems, including security, radio and closed-circuit television, and the Flight Information Display System (FIDS), a comprehensive system that tracks and displays every flight's number, gate, arrival and departure time—data that is used by various departments to determine such plans as evacuation procedures or fast-food counter staffing.

If those kinds of systems suggest a large, multilevel IS department, you'll be surprised to find that Fraser operates the entire AMIS division with just 12 employees: a project manager, an applications manager, a LAN administrator, two PC technicians, six programmers and a secretary. "In terms of our relation to other divisions, it's very simple: They own their systems entirely," Fraser says. AMIS's mission statement calls for the division to be involved primarily in the design, development and support of airport applications; once systems are up and running, the actual day-to-day operation falls to the individual divisions. "We're not trying to maintain HVAC computers in the field, but we may be asked to advise and assist if they want to upgrade or connect to a new system," Fraser explains.

A**sk Fraser, or any technology-minded** manager at IAH, what his or her principal stumbling block is, and the answer nearly always comes back the same: procurement. Because IAH is run by the city of Houston, all purchasing must in one way or another pass through the municipal budget process. "Procurement is really a challenge, and I don't mean that from a people standpoint," Fraser says diplomatically. "It's just with all the laws and rules, it really is political. I'm not saying tear down all the walls, but procurement is a bugaboo to get anything done in the technology arena."

Any new purchase, from an office chair to a new warehouse inventory system, must be submitted as a line item in the appropriate division's budget. Divisional budgets are then accepted or rejected by Aviation Director Gaines and folded into the DOA budget, which is incorporated into the city budget, approved by the mayor and voted



on by the city council.

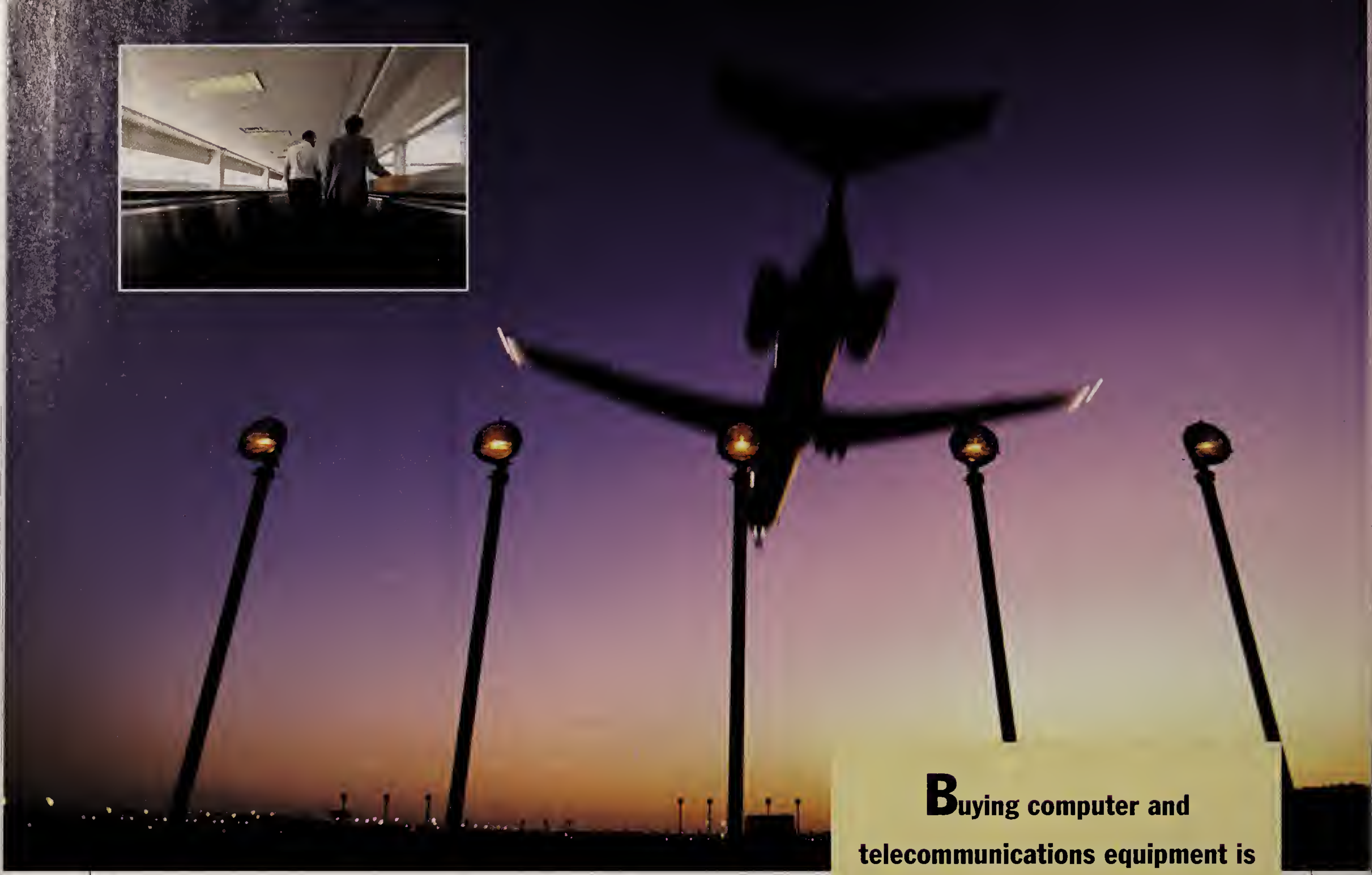
Divisions that are budgeted to purchase a major system, such as a new inventory system, must next issue a request for proposal (RFP). Both Fraser and Rudy Davila, senior administrator of telecommunications, lament this RFP process, which can add from nine to 12 months to a project. "I may have already purchased one Northern Telecom switch, and our consultant may have called for NT again in his recommendation, but I can't specify Northern Telecom Inc.," Davila explains. "All I can specify is that the switch I want must be able to talk to my other networks." Each time, the division must re-evaluate proposals based on what the products or services do, how well they work and what they cost. And for bids of more than $5,000, the winning request must be submitted to city council for one more stamp of approval.

Both men acknowledge that the process can have a silver lining of sorts. "You can't go into these RFPs with any preconceived notions; you really can't," Fraser says. "It really may be that a competitor works better and cheaper." In addition, having to work so far in advance makes managers less apt to have technology "emergencies" in the middle of the year and more likely to plan far ahead for and fully justify any new equipment or systems.

And, painful as the process can be, buying computer and telecommunications equipment is actually less restricted than other large purchases, thanks to a citywide high-technology RFP process that was adopted several years ago. So long as a strict set of rules and guidelines are followed, technology buyers aren't forced to automatically accept the lowest bid on any request they send out, as is often the case with local, state and federal procurement, Fraser says. Instead,

AMIS's mission is to be involved primarily in the design, development and support of airport applications; once systems are up and running, the actual day-to-day operation falls to the individual divisions.

TECHNOLOGY BUYERS *aren't forced to accept the lowest bid on an RFP.*



HOUSTON'S AMIS *department plans to computerize every aspect of the planning, design and construction group.*

Buying computer and telecommunications equipment is actually less restricted than other large purchases.

bids are evaluated on a wide range of criteria—price, of course, but also performance, functionality and longevity—and are scored accordingly. The winner is not always the one that submits that lowest dollar-figure bid, Fraser explains, but the one that best meets all levels of requirement.

Fraser also teamed up with IS managers from other city departments, including public works and health, to develop a citywide high-tech procurement catalog. Now, rather than having to solicit bids for specific items that have already been approved, city departments can buy budgeted items directly from one of two pre-approved providers—Entex Information Services for software and Hewlett-Packard and Compucom Systems Inc. products for all other hardware. "Now we can buy things whenever we want to without it being 'city council this and city council that' because they've already approved it," Fraser says. "If you work the system, it helps you."

When the system does work—from budgeting and procurement through design, development and support—the results can be impressive. AMIS is nearing completion on an ambitious project to completely computerize every aspect of the planning, design and construction (PDC) group, which is charged with building, rebuilding and refurbishing the airport facilities on a continuous basis. The multiprogram system, developed almost entirely in FoxPro by AMIS's programmer analysts, tracks everything from the companies that bid on a specific proposal, to where and when blueprints are distributed, to the dollar figure awarded to various contracts, to the payment schedule for subcontractors.

In accordance with Fraser's mandate for IS, PDC Deputy Director Keith Chapman, and not AMIS, is entirely in the driver's seat for the project. "He's the designer. We're programming what's in his head," Fraser says. "We've got thousands of fields all relating to his business—change orders and telephone numbers and people and vendors and legal. We have [fields for] when they wrote the contract, when we sent it back to them, all the dates and times and facts. It's like automating a business unto itself."

Despite the scope of the project—the planning and construction modules are up and running and programmers are now at work on financials and report graphics—Fraser and his staff are always clear on what's really driving the development. "This is not a program that MIS delivers to somebody else," he says. "Mr. Chapman is acting as the analyst the whole time. We're just programming his vision."

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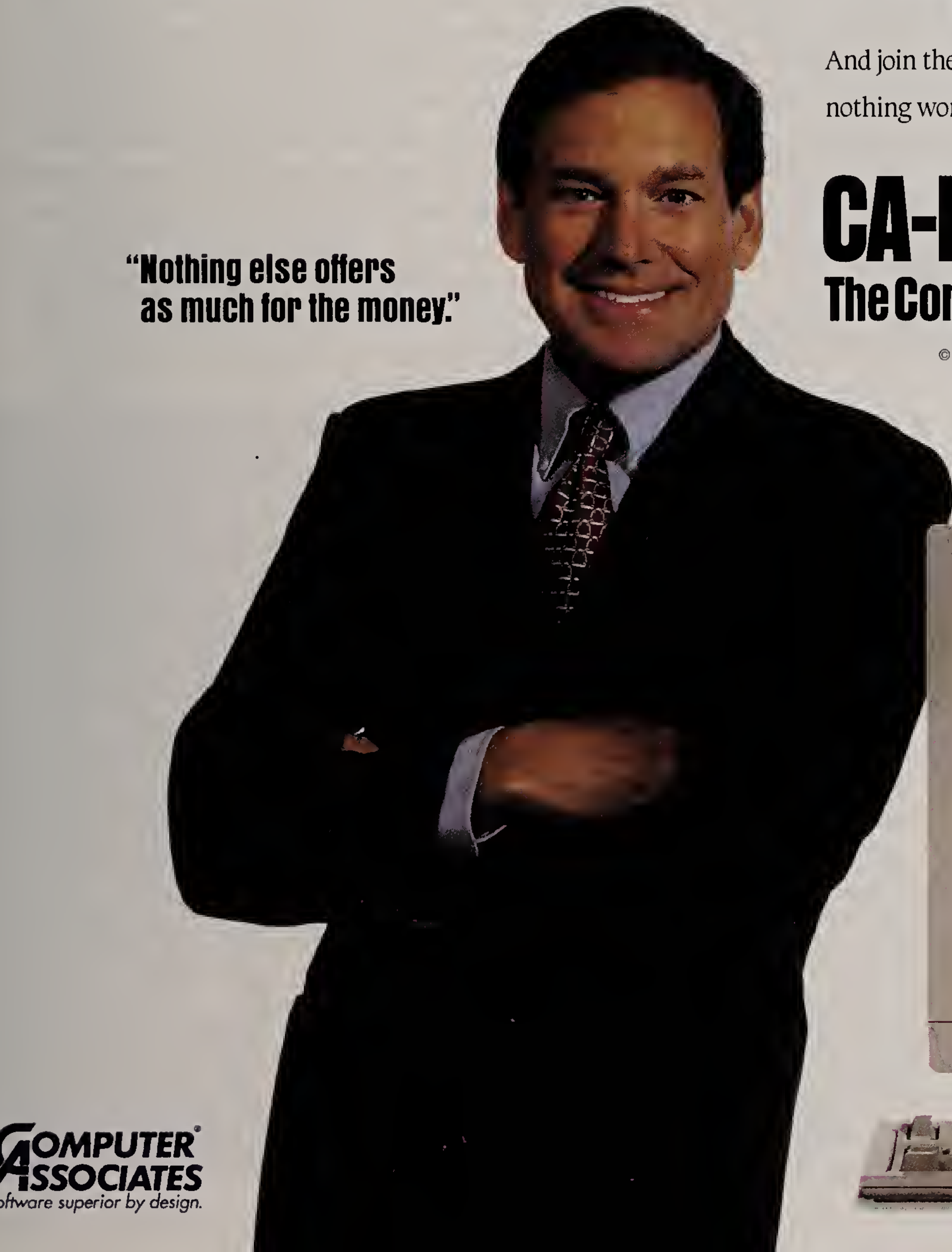

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Airport '95

What does it take to run an airport these days? Lots of technology and a little politics on the side.

Part Two

Houston's Aviation MIS Manager James Fraser claims that each Department of Aviation (DOA) division is the "owner" of its own technology systems. If so, then Frank Haley and Rudy Davila can be considered certified IT real estate moguls.

As superintendent of administrative services at Houston Intercontinental Airport (IAH), Haley is directly responsible for the systems most critical to airport operation and safety. Davila, senior administrator of telecommunications, oversees the web of leased T-1 and all fiber-optic and copper wiring that connects IAH's six principal buildings along with the city's two other airports. Between them, the men preside over the lion's share of the systems that keep IAH up and running safely and efficiently.

From inside the airport's sanctum sanctorum, the Communications Center in Terminal A, Haley's airport supervisors watch over consoles that display real-time data from all over the airport—radio communications, security alarms, maintenance alarms, data from the main airport switchboard and job control requests. The Communications Center houses the Houston Police Department's dispatch center for the airport and the northern part of the city. Banks of television screens on three walls display feed from a selection of hundreds of closed-circuit television (CCTV) cameras from around the airport grounds as well as CNN and the three major television networks. The main switchboard for the airport fields and directs some 500 phone calls daily.

At the center of day-to-day operations is FIDS—the Flight Information Display System. To the traveler, FIDS fills the video screens located inside the terminals that display the flight arrival and departure times, flight number, terminal and gate numbers, but to airport managers, those video screens are simply the tip of the iceberg. "FIDS is the definitive log of traffic through the airport," says Haley. "The system lists every arrival and departure and the correct location for each flight. It's the most important database of information because it drives so many other operational activities, everything from security clearances to building services to rental car staffing."

The system, according to Fraser, comprises proprietary hardware and software from Infax Inc., including a minicomputer server, data terminals in the Communications Center, data-to-video converters and the video display screens in the terminals. In the domestic terminals, individual airlines lease space long-term from the DOA; these carriers maintain their own FIDS systems and their own video displays and simply upload flight data to the Communications Center FIDS. In common areas of the terminals, Haley's section maintains Mutual Use FIDS (MUFIDS) displays, which accept data from

RUDY DAVILA *oversees IAH's connections with Houston's two other airports.*

all carriers, re-sort it and list every flight from every carrier in alphabetical order by city destination or arrival.

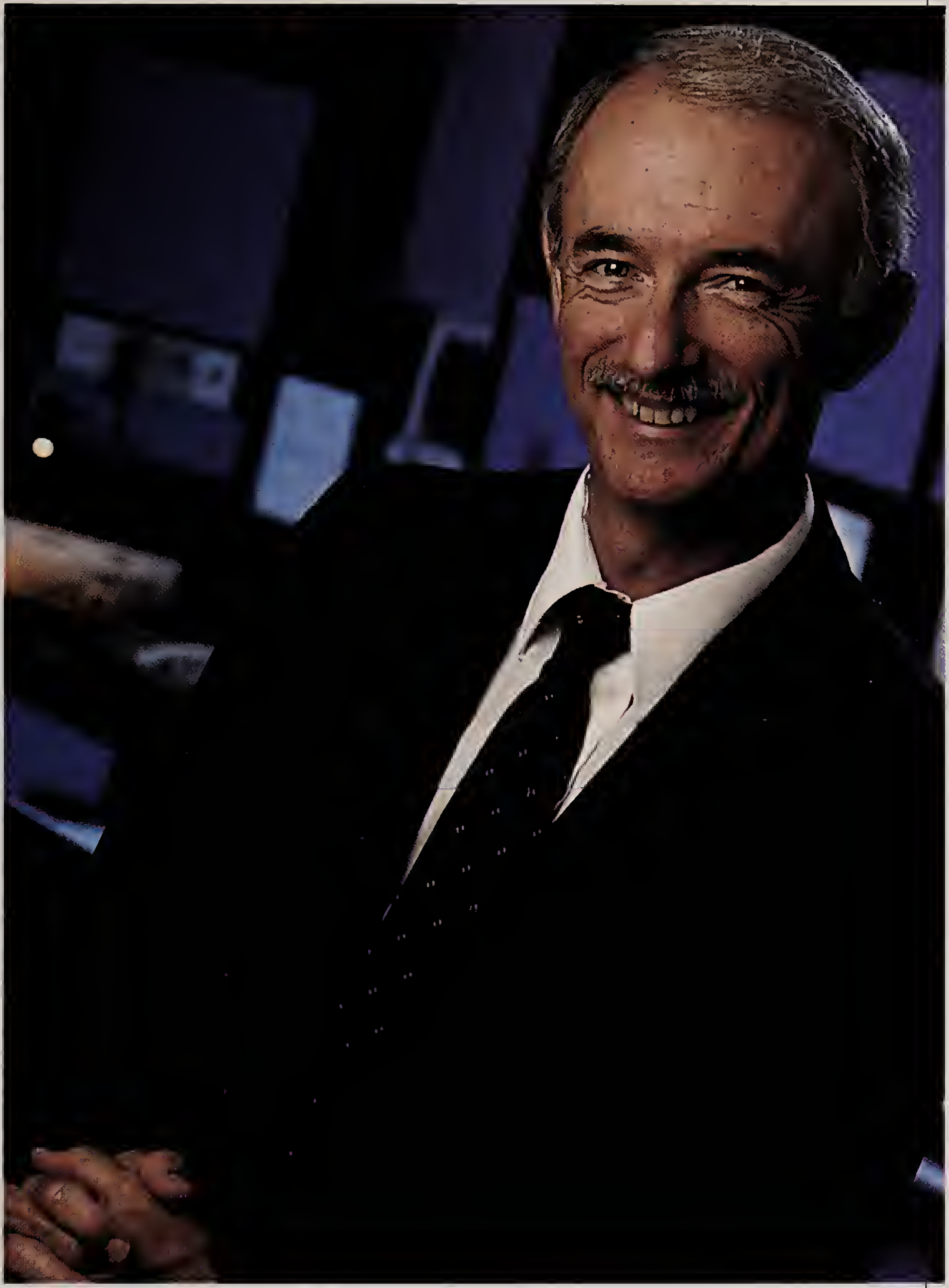
The situation gets a bit more complicated in the Mickey Leland International Airlines Building (IAB). In addition to collecting, verifying and displaying the flight information, Haley's group is also responsible for the actual scheduling of gate assignments in the IAB. Because the terminal operates under a "common use" scheme instead of a leased-space system, the DOA—not the individual airlines—is responsible for ticketing, gate and baggage claim areas, telecommunications, scheduling and signs. A new, custom-built software module that ties into the existing FIDS enables Haley's employees to dynamically change the signs above the ticket counters and baggage areas to depict whatever airline is using the position at the moment.

Using data from FIDS, for example, workers in the Communications Center (some 2 miles away from the international terminal) can program the scroll sign and airline logo above Gate 8 to indicate that an Air Canada flight will depart for Toronto at 12:30 p.m. Two hours later, they can change the signs to indicate that an AeroMexico flight to Cancún is departing at 3:35 p.m. from the same gate. Ticketing and baggage claim positions in the IAB sport similar dot signs and are programmed in the same way.

If FIDS is the system most crucial to day-to-day operations, the Alarm Event Integrated System (AEIS) is critical to the continued safety and security of the airport. The AEIS, which grants and restricts access to all nonpublic areas of the airport via identification badges and magnetic-strip readers and officially went online at IAH in February, is actually an older Access Control System that was updated to the tune of $12 million.

This retrofit brought the system into compliance with the FAA's FAR 107.14 security regulation. "You have to have badges to keep people out of places," explains Haley, "but you also have to recognize intrusions and respond to them. That part had to be developed." Part of the $12 million went to installing a separate closed-circuit TV system with some 450 cameras around the various airport properties. "For CCTV, we had wire pulled everywhere; we installed a complete fiber-data network just for that," Haley says.

The end-to-end AEIS—which requires, among other hardware, a digital camera, PCs, the airport's Stratus mainframe, the fiber network and radio communications—works like this: All airport employees, contractors and guests are issued a badge, which grants access in large-area blocks according to color (green allows access virtually anywhere, for example; red only to a very limited number of nonpublic areas) but can also be programmed via software to grant or restrict entry on a door-by-door and time-sensitive basis. When an alarm is received, Haley's group can use the CCTV to get a look at who is tripping the alarm, pull up a digitized picture of the employee who was issued the badge in question and see if the two images match. Both security and maintenance alarms (which are triggered, for example, if a door has been left open too long) are the responsibility of the Houston Police Department, which uses a separate radio frequency to send personnel to check out suspicious situations. The newer



FRANK HALEY *is directly responsible for the systems most critical to the airport's operation and safety.*

IAB boasts an end-to-end level of security that Haley and Fraser hope to eventually replicate throughout the domestic terminals: Everything from parking lots to offices to elevators to baggage belts is activated by badges, thereby increasing security and simplifying maintenance. "Everything in the IAB is card-based," Haley says. "We're trying to get away from keys altogether."

Of the IAB's technological innovations, none was so radical or has been as well-received as the building's universal cabling system. As it became clear during the planning stages that the Houston DOA was prepared to commit to a European-like shared-tenant system for the IAB—where ticketing, gate and baggage areas are common spaces charged on a usage basis rather than the long-term gate-by-gate leasing that is typical in the United States—telecom administrator Davila saw his chance.

Davila wanted to scrap what he calls the "spaghetti in the walls" of multilease terminals, where each airline installs, upgrades and continuously changes the wiring required by its dedicated telecom system. Instead, Davila proposed installing a universal cabling system that would meet the needs of any and all tenants, saving the walls and ceilings from future mayhem and allowing Houston the flexibility to assign carriers to any gate or ticket position.

What followed was an arduous and, at times, contentious vetting process where every future tenant of the IAB challenged Davila to prove how his proposed wiring system—AT&T's Systimax fiber-optic-plus-copper

Enlisting the Upper Echelons

Given the right time and circumstances, many upper managers will confess sotto voce that they have yet to grasp the nuances of the jargon that their IS chiefs spout all day. Ask Houston Director of Aviation Paul B. Gaines how he feels about information technology, and he'll proclaim for all the world to hear that much of it is a mystery to him. "I know a little bit about airports, and my managers know a lot about their specific disciplines. I make them come down to the second-grade level and tell me how their applications would help us in the day-to-day activities of the airport."

The managers to whom Gaines refers are James Fraser and Rudy Davila, Gaines's MIS manager and senior administrator of telecommunications, respectively. Though the men are separated from Gaines by several layers in the organizational chart, they enjoy a virtual open-door policy when it comes to pitching new IT projects.

"We can present an idea and get him to say, 'Yeah, there's some interest here.' It's a matter of bouncing ideas around," explains Fraser. "You don't end up wasting a whole lot of research time or putting formal presentations together."

Despite his proclaimed IT innocence, Gaines can be counted as something of a technology-management visionary. When he came on as director in the early 1980s, airport MIS was still a centralized function—"downtown," as airport personnel refer to off-site citywide functions. Catching the early wave toward decentralization, Gaines pushed for, and received, permission to hire an MIS director dedicated to the Department of Aviation.

"The police department has technology people who are knowledgeable about crime, and the zoo's technology people know animals," says Fraser. "Police departments are different from zoo systems are different from aviation systems. It was just a matter of Paul saying, 'Get these people closer to me.'"

Still, the man whom employees universally regard as a micro-manager—until just recently, the stories go, he personally signed off on the selection and color of every office chair in the department—doesn't easily give away his trust. All three say their current arrangement was arrived at only after years of working side by side—and years of successful IT execution.

"They know where I'm coming from, and they know what I'm not interested in, although that doesn't seem to stop them," says Gaines. "They'll run anything up the flagpole, but my questions are, does it work, what are the cost benefits, and does it provide a higher level of service to our customers?"

For their part, Davila and Fraser say the unique relationship allows them the freedom to operate quickly and honestly in what can sometimes be a high-stakes environment. "With the relationship that we have, there aren't the pressures of wondering if you're on shaky ground," Fraser says. "We had to earn all that, but now he can say no and we can try one more time without having to worry about our jobs. And that's a real time-saver."

–T. Mayor

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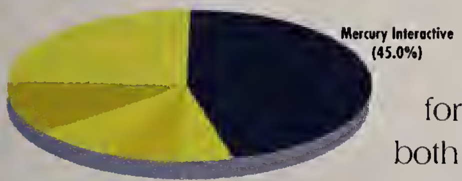

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ECKXCO

IAB IS THE FIRST *terminal in the world to install a universal cabling system.*

Davila wanted to scrap what he calls the "spaghetti in the walls" of multilease terminals and install a universal cabling system that would save the walls from future mayhem.

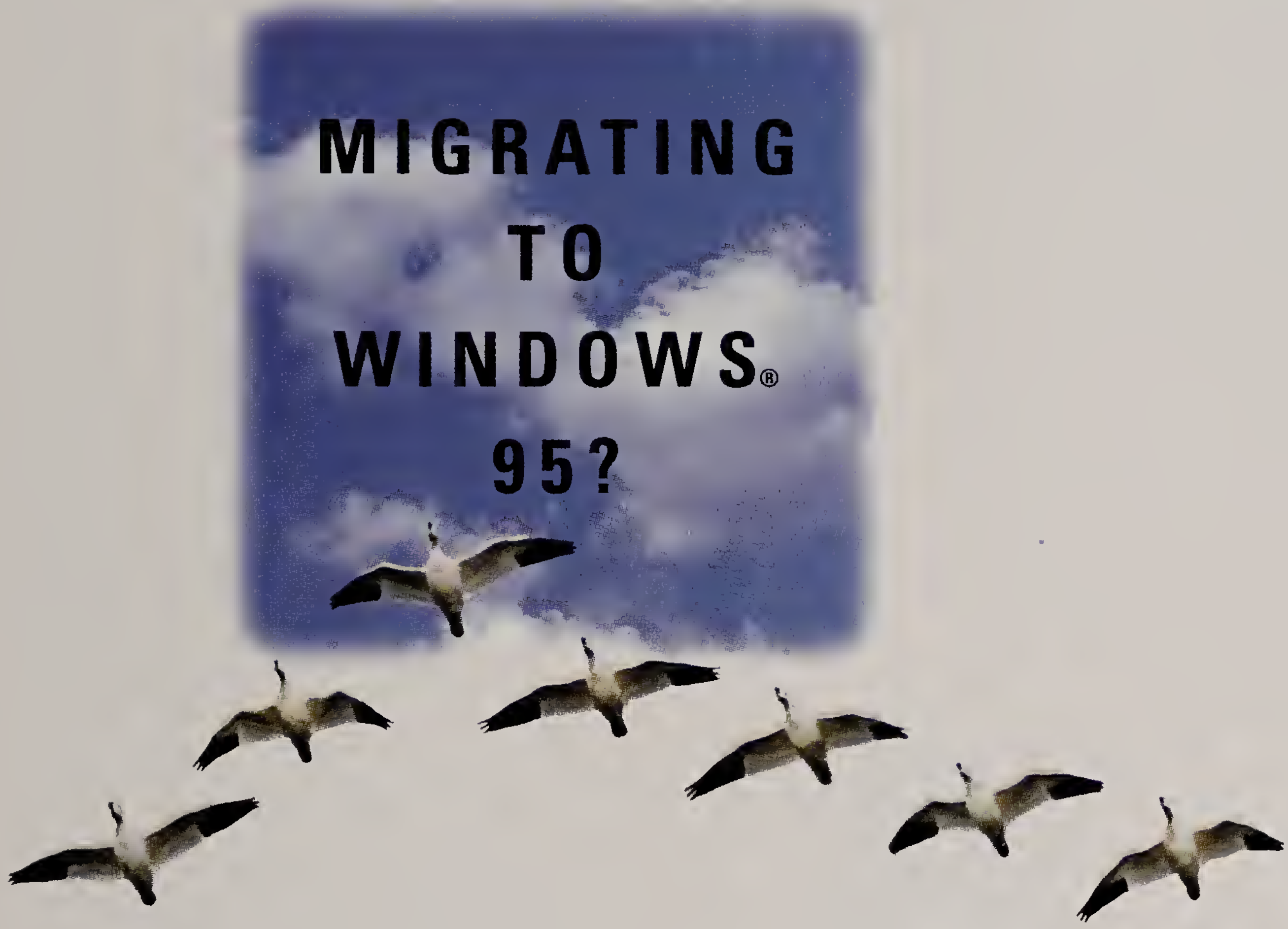
scheme—would be both more cost-effective and better performing than what they were using, which was typically standard unshielded twisted, shielded, twinax and coax cable. "They had 1960s technology, and I proposed bringing them up to the 1990s and guaranteed them it wouldn't be more than 15 percent more than they were paying per month for the old stuff," says Davila.

As a result of Davila's efforts, the Leland IAB became the first terminal in the world to install a universal cabling system that handles all telecommunications needs, including PBX traffic, voice mail, a cable management system, public, courtesy and information phones, building security, HVAC and energy systems. The high-bandwidth, economically maintained system boasts a fiber-optic backbone and, in some cases, both fiber and copper down to the workstation level, as is the case with the ticketing counters. The ticket positions, as well as gate counters and baggage areas, are equipped with telephones and CUTE2 (Common Usage Terminal Equipment) stations, which were developed by London-based SITA (Société Internationale des Télécommunications Aeronautiques), an airline consortium. The CUTE2 stations are essentially dumb terminals running universal software that allows each airline to connect via dial-up line or leased line back to its remote host system, Davila explains.

Taking the concept of universality one step further, Davila functions for IAB tenants as a de facto phone company of sorts. Companies sign an exclusivity contract with the DOA, which then negotiates with Southwestern Bell and other providers to set up cable connections, dial tones, telephones, leased lines to carriers' host computers and whatever other telecom services tenants require. Airlines are relieved of the responsibility of having to negotiate separate local, long-distance and hardware/maintenance contracts, and the airport retains control over its terminal and has the opportunity to turn its telecommunications efforts into a profit center. Davila is particularly proud of his service record. "We can offer two-hour response times rather than the six hours you'd get from the phone company," he says. "For airlines, it's a productivity issue." The "we" in this case is Davila, his staff plus a team of subcontractors from Southwestern Bell Telecom. Under the terms of a long-term contract, Charlie Grimes, who works on-site full time in the massive switching room beneath the IAB's main hall and is responsible for all preventive maintenance, all MAC (moves, adds and changes) work and all trouble calls for the terminal.

That leaves Davila free to turn his attention to the IAB's less-sophisticated sister terminals. The DOA is in the midst of a multiyear project to update the airport's aging telephone switches—with the exception of the IAB's digital PBX, all switches are still analog and two are even older AT&T systems. In addition, Davila's group is laying fiber-optic cable wherever possible to replace the costly leased T-1 lines that currently run between several different airport locations. Finally, Davila is working with Director of Aviation Paul B. Gaines to replicate the tenant services scheme in the domestic terminals. "I've got [domestic] airlines asking me now what they need to do to get on my system," Davila says. "We're not ready for them yet, but we will be." CIO

Tracy Mayor is a freelance writer and editor based in Beverly, Mass.



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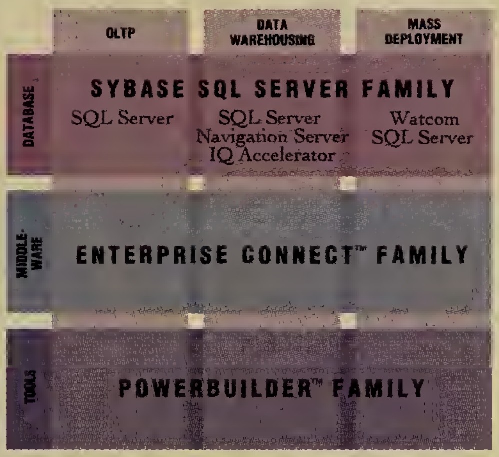

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PREPARING • FOR CHANGE

Modern Medicine

With changes sweeping the health-care industry, pharmaceutical companies are struggling to maintain healthy profits. And IT may very well be the spoonful of sugar that helps the medicine go down.

BY E.B. BAATZ

It's 11 a.m., Nov. 11, 2011. Time for your heart medicine. Just the other day you logged on to the pharmaceutical company's network to refill your prescription. The pills were delivered to your home overnight.

Thank goodness your cardiologist got an urgent e-mail from the drug company, warning her about potential adverse reactions with the new antidepressant that your psychiatrist began prescribing and the Chinese herbal remedy that your acupuncturist is administering for your chronic bloodshot eyes. After a videoconference between you, your doctors and a drug company clinician, it was decided that staggering your heart medicine dosage in six-hour intervals would avert any danger. Your HMO pays extra for the drug

THUMBNAIL

Industry: U.S. prescription pharmaceuticals

Primary Products: Brand-name prescription drugs

Industry Revenues: Approximately $56 billion in U.S. sales

Number of Players: Approximately 100 companies

SOURCE: PHARMACEUTICAL RESEARCH AND MANUFACTURERS OF AMERICA

FORCES OF CHANGE

Managed Care: The health-care industry shifts from a fee-for-service model to a managed-care system.

Impact: The customer base, which used to be individual doctors, shifts to big buying groups such as HMOs and PBMs. This gives rise to new marketing tactics like "disease management" that require big and complex databases on outcomes and costs by patient.

Price Pressures: Costs continue to skyrocket, but industry executives are under pressure from cost-conscious managed-care organizations to hold down price increases.

Impact: Companies that used to simply pass higher costs along to consumers now must control production and regulatory costs assiduously. Getting business functions to work together around the globe to reduce costs becomes imperative.

Competition: With a third of the industry's best-selling patents about to expire, 320 companies that make generic drugs are ready to pounce. Also, big changes in molecular drug research make the R&D for new drugs much more competitive.

Impact: As competition increases, speed to market becomes more important. Sharing more R&D information internally, partnering with technology and biotechnology companies and working with the FDA to speed drug approval all become critical to success.

ILLUSTRATIONS BY JAMES YANG

I.S. ACTIONS

Integrating the IS functions of the various arms of the multinational pharmaceutical company—prescription, over-the-counter, generic and clinical lab divisions (and perhaps eventually the newly purchased pharmacy benefits management company)

Migrating from the mainframe and architecting a networked, flexible client/server system to speed information sharing between the business functions as well as between strategic business partners

Reengineering the supply chain to increase productivity and wring costs out of the manufacturing, distribution and sales functions

Inventing new data applications and exploring the online environment with business unit heads in order to help the company build stronger and closer relationships with big contract customers as well as individual doctors

Encouraging research and development to share data via new groupware applications and investing in parallel-processing computers to speed drug development cycles

Negotiating with the Food and Drug Administration to move the now paper-bound drug approval process into the electronic age

Creating international industry-wide standards so that common coding schemes can be used to drive the industry forward

company's disease management expertise but saves money by keeping you out of the emergency room. And the drug company's vast patient-outcomes database helps everyone—everyone with the necessary security codes, that is—track care and costs over the course of your heart disease. You pop the pill and set your wrist alarm for 5 p.m., as your ticker keeps on ticking.

If things go the way big multinational drug companies predict, the future will look a lot like this 2011 medical odyssey. Of course, legal challenges, technical glitches and consumer resistance might throw a monkey wrench into this vision. And right now, uncertain market conditions and a changing customer base have drug company executives busier worrying about next year's sales and emerging competitors than dreaming up scenarios for 15 years hence.

"The health-care marketplace has opened up and the final players have yet to be determined," says Anil Cheriyan, a partner and pharmaceutical expert at Coopers & Lybrand LLP in New York. Hospitals, HMOs, drug distributors and pharmacy groups, as well as telecommunications and software companies, are all now vying for a slice of the $1 trillion health-care pie.

It's anyone's guess whether drug companies will be successful in their bid to dominate the rapidly changing health-care environment, for a dizzying number of changes are rocking the prescription-drug market. The introduction of managed care in the 1980s and President Clinton's push for health-care reform in the 1990s have made the past few years challenging for pharmaceutical companies.

> *"Pharmaceutical companies were used to making so much money, almost in spite of themselves."*
>
> –RON KUBERA

"We've seen more change in this business in the past three years than we had seen in the previous 25," says Stephen Thompson, who is vice president of information resources at DuPont Merck Pharmaceutical Co. in Wilmington, Del. For one, the customer base is diversifying. Also, costs are soaring, but drug prices cannot. Finally, increasing industry consolidation, growing competition from generic drug makers and an explosion of global regulations have put a new premium on speed and efficiency.

What is the magic pill that many senior drug company executives now expect will help them survive these upheavals? Why, information technology of course. For IS executives who, according to one source, used to be "right up there with building services," senior management's new IT vision is a big change indeed.

"The whole story in the health-care industry—particularly in this country, but also in most other developed countries—is the shift from medical risk/benefit decision making to cost/benefit decision making," says John Parker, senior vice president and director of information resources at SmithKline Beecham in Philadelphia. The customer base of individual doctors, who had been wined and dined by drug company representatives for the past 30 years, is being slowly supplanted by big, powerful buying groups such as health maintenance organizations (HMOs) and pharmacy benefits managers (PBMs).

These buying groups are devising formularies, or preferred lists, of drugs for their patients, which pharmaceutical companies are scrambling to dominate. "There's still a lot of detailing [marketing to individual doctors] going on, but five years from now, contract sales will account for 60 percent to 90 percent of the market," predicts consultant Mark Mozeson, a principal specializing in the pharmaceutical industry at Deloitte & Touche LLP in New York.

To deal with this change in the customer base, the pharmaceutical industry has devised a new sales and marketing approach, dubbed "disease management." "This is still in its infancy, but the idea is to manage down the cost of treating a disease through the entire course of treatment," says Mozeson. In general, the plan is to track the progress of diseases—and, of course, the drug purchases—of individual patients.

COMMON THREADS

IS executives in industries undergoing dramatic change should:

Get involved with executive leaders to chart the IT-empowered future. Pharmaceutical industry IS executives are getting closer to their CEOs and are joining executive-level strategic sessions.

Build partnerships with other companies outside the industry. Drug company executives are teaming up with (or buying) biotechnology companies for R&D help, with pharmacy benefits managers for data warehousing help, and with electronics and telecommunications companies for networking help.

Stay flexible by shifting from mainframe-centric operations to client/server. In the pharmaceutical industry, the client/server shift is enabling supply chain reengineering and R&D data sharing, as well as helping drug companies to speed time to market. It's also essential to train IS staff for the new paradigm.

Be curious about new trends in IT. For example, developments on the World Wide Web have made some pharmaceutical IS executives more interested in new tools for filtering and mining information.

Watch out for consumer resistance and possible ethical pitfalls. When IT enables big, new databases—like those being built with patient outcomes data—new ground is broken. As with any change of this magnitude, unpredictable reactions from consumers and regulators should be expected.

As they begin collecting data that's likely to confirm the long-term cost-effectiveness of drugs, pharmaceutical companies hope to increase sales by making information a value-added component of drug contracts signed with big, cost-conscious buyers.

Furthermore, building such databases will help drug companies do demographic analysis of demand and perhaps even market their wares directly to patients. In fact, Eli Lilly and Co. has already begun airing a national advertising campaign that pitches the slogan "knowledge is powerful medicine."

In order to create comprehensive disease-outcome and patient-cost databases, many drug companies rushed to the top of the database hill last year in a PBM buying spree. SmithKline Beecham acquired Diversified Pharmaceutical Services; Merck & Co. bought Medco Containment Services; Lilly purchased PCS Health Systems; and Rhone-Poulenc Rorer, Pfizer and Bristol-Myers Squibb all partnered with Caremark International. This trend, in turn, has created a need for more sophisticated tools such as data warehouses, groupware and networks for managing and sharing information.

"We think there will be value in combining prescription-drug information, claims information and clinical lab information," says Parker of SmithKline Beecham. Wary of potential ethical conflicts, however, SmithKline Beecham has for now voluntarily agreed with the Food and Drug Administration not to use sensitive information on competitors' products obtained through its PBM.

Likewise, Lilly's acquisition of PCS Health Systems Inc. of Scottsdale, Ariz., bought the company a patient database of 55 million names. "We aim to have 100 million by the end of the decade," says Tom Trainer, CIO of the $5.7 billion Indianapolis-based company. With the country's largest drug-usage database in hand, Trainer is just starting to roll out new data warehouses and explore data applications. Trainer, who left Reebok International Ltd. to join Lilly in early 1995, has recruited folks who helped him engineer terabyte-big database environments in the marketing research division of A.C. Nielsen Co. Inc. years ago.

Acquiring PCS also gave Lilly a critical foothold in another emerging high-tech area of the health-care business: networking. Because the deal landed it a 29 percent indirect equity stake in Integrated Medical Systems Inc. (IMS) of Golden, Colo., Lilly gained access to a network that currently connects more than 20,000 doctors' offices and 100 hospitals. The opportunities for synergy between drug companies and networking companies like IMS—a leader in creating ISDN networks and business alliances to help hospitals develop enterprisewide electronic medical records—are being explored by all the major pharmaceutical firms. But Lilly was the first to

PHARMACEUTICAL INDUSTRY AT A GLANCE

PAST

Close relationships between pharmaceutical company salespeople and doctors ensured powerful brand-name clout. Rising costs were not an issue because drug companies simply passed on the increases to the consumer in higher prices, which company-sponsored insurance plans paid for without blinking. The process of discovering new drugs was so complex and mysterious that when a compound was invented, it was unlikely that a competitor would quickly challenge the patent.

FUTURE

Assuming that consumers go along with it, pharmaceutical companies will sell information about disease outcomes and costs, as well as drugs, to HMOs and PBMs. Brand-name prescription drugs will be marketed directly to the consumer via TV ads, the Internet and telemarketing. With pressures to hold down price hikes, drug companies will (reluctantly) allow their return on equity to fall. And research firms, government, hospitals and patient-advocacy groups will work together to develop more cost-effective health-care programs.

set up business stakes on the World Wide Web (*http://www.lilly.com/*).

The shift to managed care has affected not just sales and marketing but also the fundamental cost structure of the pharmaceutical industry. Big buyers, as well as the president of the United States, have put pressure on drug companies to hold down price increases. In fact, 19 leading pharmaceutical firms promised in 1994 to hold their average price hikes below the general rate of inflation, which means cost increases can no longer be simply pushed on to the consumer. Yet costs continue to skyrocket.

Research and development investments, for example, have been doubling every five years since 1970. Recent discoveries of drugs for such things as migraine headaches and depression have reinforced the industry's belief that spending more on R&D assures continued growth. And since one-third of the industry's 300 best-selling brand-name drugs, worth $37 billion in sales annually, will be vulnerable to competition from generic drug makers when they go off-patent over the next 10 years, branded pharmaceutical companies are depending on R&D investments to yield new drug discoveries. So, today the industry invests about $13 billion on R&D, or 17 percent of total sales. Also, the costs of complying with diverse regulations and getting new drugs approved around the globe have risen too, as developing nations get stricter about the medicines sold by multinationals.

> *"Big companies are spending millions of dollars on costly IT solutions such as image-based systems, but I know of at least one effort that the FDA says was a flop."*
>
> –FRED KNOX

"Pharmaceutical companies were used to making so much money, almost in spite of themselves," says Ron Kubera, manager of the chemical and pharmaceutical industry group at supply chain software provider Manugistics Inc. of Rockville, Md. Now, wringing costs out of every business function has become imperative. Functional silos are coming down, and nearly all of the pharmaceutical companies are just starting to reengineer their supply chains.

For example, at CIBA-Geigy Ltd., a pharmaceutical company based in Basel, Switzerland, the 150-person, $40 million U.S. IT group is reengineering its manufacturing, order processing, customer service and

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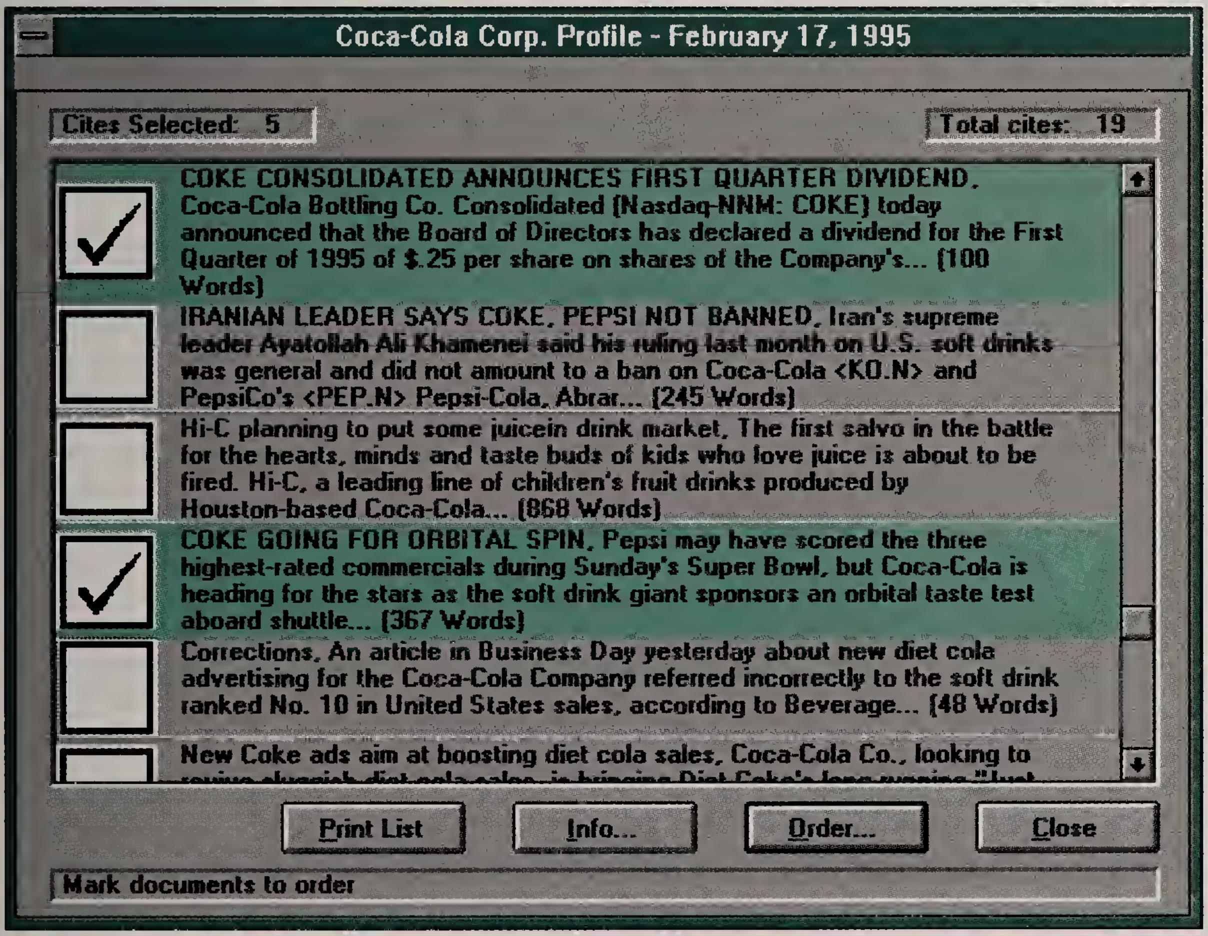

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"We used to handle one molecule at a time; now we are handling gigabytes of data."

–MYRA WILLIAMS

distribution processes for its prescription-drug business. "We will be replacing our mainframe and midrange systems with client/server systems," says Gerald Paules, executive director of IS at CIBA-Geigy Pharmaceuticals Co. in Summit, N.J. The new system will allow the company to integrate business processes and thus slash time to market. In fact, the radical shift in platforms from monolithic mainframes to speedy distributed PCs seems to be capturing much of the attention of IS executives throughout the industry.

At Lilly, the European distribution chain has been rebuilt from 28 warehouses to just six high-tech, automated warehouses. At Johnson & Johnson Inc., a Health Care Systems group has been created to coordinate supply chain initiatives of J&J's many health-related divisions such as Ortho-McNeil Pharmaceutical Corp. and Janssen Pharmaceutica Inc. And at Whitehouse Junction, N.J.-based Merck & Co. Inc., after spending 24 months building a new integrated procurement system, Ian Michael Miller, executive director of automation and IT, has begun to integrate the company's global sales, marketing and financial functions.

On the research side of the business, companies are investing in advanced computing technology in order to streamline drug creation and speed regulatory compliance. A leader in the use of computerized drug design, DuPont Merck announced in 1994 that it had developed a medicine for AIDS using Evans & Sutherland 3-D molecular modeling software on a network of Silicon Graphics workstations. This effort shaved years off the typical development time.

"We are also using mini-supercomputers to predict which compounds will be biologically active, and this is increasing the probability that the compound we synthesize will have the desired effect," says Thompson. Such high-tech developments are not cheap. DuPont Merck, a $1.3 billion independent joint venture between DuPont and Merck, now spends approximately $40 million on IT annually, after investing significantly more over the previous four years, says Thompson.

These technological advances in so-called rational drug design are themselves creating the need for faster and faster drug development. Due to computer-assisted drug design, the 10 to 15 years that a drug company used to have to develop a new drug before competitors figured out the formula and sneaked in a patent has been reduced to only a few years.

Dr. Myra Williams, who oversees worldwide R&D information resources for Greenford, England-based Glaxo Wellcome PLC from her offices in North Carolina's Research Triangle Park, explains that the drug industry "used to be operated more like a cottage industry," synthesizing one

A Hard Pill to Swallow

The whir of an outdated Rolodex signals the end of an era for pharmaceutical industry CIOs

Reporting on information technology in an inherently secretive and lately beleaguered business like the pharmaceutical industry was like speeding in the breakdown lane on the New Jersey Turnpike during a downpour: little traction and limited visibility. With no inside track to pharmaceutical executives, this reporter made over a hundred calls to flesh out some IT leaders who would be willing to talk.

The big break in the story—and the encounter that illuminated the turmoil that IT executives are facing these days—came when a source provided the direct-dial phone number for the number-two IT director at a large multinational drug company. The conversation went something like this:

"Sure, I'd be willing to talk with you, but, ummm, I'm leaving this job in about two to three weeks."

"Oh. Are you moving to a new job?"

"No, I'm just, ummm, just leaving. Don't know what I'm going to do next."

"Well, can you recommend anyone else for me to talk with? I'm getting desperate. Very few executives seem to want to talk to me."

"Okay, let me look through my Rolodex." The flip of cards is heard in the background. "Gone...gone...gone.... Gee, this is incredible."

Indeed, according to several industry sources, over the past two years, 40 percent of the CIOs who were members of the elite Pharmaceutical Information Services Association, better known as PISA, have disappeared, to be replaced by a new crop of managers. In many cases, they are fresh faces in the pharmaceutical industry—for instance, Tom Trainer, formerly of Reebok International and now with Lilly, or Brian Crynes, formerly of Apple Computer and now with Bristol-Myers Squibb.

"Is it that CIOs in the pharmaceutical industry just weren't that good?"

compound at a time. "Now we understand the molecular mechanism of drugs much better, so everyone knows relatively early when someone has made a breakthrough," she says. As a result, competition is stiffer. Furthermore, the creation of huge gene-mapping databases like that of Human Genome Sciences Inc. in Rockville, Md., and Incyte Pharmaceuticals Inc. in Palo Alto, Calif., are "forcing us to create entirely new computer paradigms," says Williams. "We used to handle one molecule at a time; now we are handling gigabytes of data."

Another area in which drug companies are looking to use technology to increase speed: the laborious, paper-intensive FDA approval process. "The industry is accustomed to sending moving vans of paperwork to Washington, D.C., and then waiting years for the review process to percolate through the agency," says Fred Knox, director of IS for Alza Corp., a $279 million contract drug research and manufacturing company based in Palo Alto, Calif. "If there was a way to speed up the approval process by just a couple of months, we'd be hopping all over each other to do it."

Alza has experimented with loading its clinical trials results for a new drug onto a third-party Digital Equipment Corp. VAX computer rather than sending the FDA raw data. "Big companies are spending millions of dollars on costly IT solutions such as image-based systems, but I know of at least one effort that the FDA says was a flop," says Knox. "So these are high-risk investments."

Despite the risks of change, however, pharmaceutical industry IS executives seem excited about the future. "We won't be selling just product anymore; we'll be selling value-added services as well," says Paules of CIBA-Geigy. But, he acknowledges, "we're moving into a whole new territory where there are no clear-cut directions yet."

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questions one executive, who prefers to remain anonymous. "Well, yes, in some cases, perhaps. And some are gone because of industry consolidation. But it's more complicated than that. Until recently, executive leadership in the pharmaceutical industry just didn't value information technology as a strategic tool. And suddenly they've been hit in the back of the head with all these phenomenal changes. Suddenly, CEOs are paying attention to information technology, are dissatisfied with information technology and don't understand information technology."

Of course, one wonders how the other 60 percent of PISA members have managed to hang on to their jobs during this era of corporate quakes. Based on the number of people who flat out declined to say anything ("It would not be in our best interest at this time to grant any interviews" seems to be the fashionable response among nervous drug company flacks), it appears that many more drug industry CIOs will be euphemistically "moving on to bigger and better challenges."

Nonetheless, several of the oldtimers, such as John Parker of SmithKline Beecham and Myra Williams of Glaxo Wellcome, remain at the helm of their IT ships. Or, well, close to the helm. (Williams, the former CIO for Glaxo, now manages R&D information resources worldwide while Roger Dick performs the CIO function at the newly merged Glaxo Wellcome corporate headquarters in Greenford, England.)

What are the secrets to their longevity? The answers are all the old clichés. But they have become clichés because they work, although they are not particularly easy to pull off. So, here then are the pearls that surviving CIOs have to share with IT executives who are facing drastic change in any industry.

One, cultivate a close relationship with the CEO. "You practically have to be joined at the hip with the CEO," says one IS executive. "Because the chief can't judge me on the same objective criteria that he uses for the VP of sales and because he has a hard time telling me what he wants with the IT strategy, our relationship is really, really important."

Two, stay objective. "The more effective we can be at making decisions based on work processes and facts, the better we will be at handling mergers, consolidations and rapid change," says another drug industry vice president. That means, of course, trying to remain unemotional about your own position as well.

Three, constantly be on the lookout for ways to demonstrate the added value of what you do. The pharmaceutical industry's survivors recommend three techniques: benchmark unit costs to demonstrate efficiency, model business processes to show sponsors how IT is enabling change and strategize to find new ways to make money using IT.

And, hey, some final words of advice from this reporter: Stay out of the breakdown lane on the New Jersey Turnpike, especially during a downpour.

–E.B. Baatz

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IS Managers See the Light

No longer willing to expand their organizations one room at a time, IS managers are becoming "do-it-yourselfers" with tools that streamline and document critical applications

BY ALAN R. EARLS

If CIOs were judged the way CFOs are, they'd be in big trouble. That's the conclusion of what Howard Rubin, professor of computer science and chair of the computer science department at Hunter College in New York, calls his "black hole" study. "Generally speaking, they don't know what their assets and liabilities are," he says.

Of 2,000 firms surveyed, more than 80 percent typically had "no idea of the size of their software portfolio," says Rubin. Nor do they display much understanding of how often their applications are being used or updated, let alone whether individual applications are operating efficiently or meet quality benchmarks. "They simply don't know what they are managing or how big it is," he says. Which, he continues, probably means a big part of the millions of lines of code they "own" is poorly utilized.

The problem is both historical and economic in nature, says Rubin. "IT organizations grew by adding applications as if they were building a house room by room," he says. Documentation, discipline and long-term plans were usually secondary. So CIOs muddled through, while system and application software grew like Topsy, one Band-Aid at a time.

"It can be tough to regain control and leverage assets when you don't know what they are," says Hugh Bishop, manager of emerging technology research at the Aberdeen Group, a Boston-based consultancy.

"People don't understand that they have a portfolio of critical applications that users still need, 40 percent of which is often in Cobol," says David Eddy, director of marketing at Global Software Inc. in Duxbury, Mass. Unless a company starts from scratch in a move toward distributed computing, "the problem will just get layered deeper into their systems," he adds.

Further, budget squeezes and competition from outsourcers is raising the stakes and narrowing options. CIOs are struggling to find new ways to regain control while continuing to cope with unprecedented change.

Now, a rapid expansion in the range of automated tools on the market—many of which are served up with matching consulting practices—makes it possible for IS managers to evaluate system performance, applications and even productivity with a degree of validity and ease not previously available. Offering a soup-to-nuts range of tools and techniques, tool makers are helping managers get back in the drivers' seat, reclaim legacy system assets and even forge potent new applications. Many allow busy managers to rapidly acquire a mastery sufficient to get a grasp on their organization's IT realities—a process that once hinged solely on eliciting information from subordinates.

ILLUSTRATION BY DAVID BLACK

As IT organizations develop a clearer understanding of what needs moving, what needs updating and what can be eliminated, users sometimes discover they are running large blocks of code that no longer provide any functionality. Global Software's software tool, GILES, helps provide managers with baseline information by chewing through millions of lines of code in minutes of CPU time. It is intuitive enough that training isn't really necessary, according to Eddy, and it uncovers dependencies and other often undocumented relationships between applications as well as providing an online component directory. That means there's less likelihood someone will inadvertently pull the plug on a potentially critical bit of code.

But documenting and streamlining old Cobol applications may not be enough. Judith Hurwitz, president of Hurwitz Consulting Group Inc. in Newton, Mass., says that more-modern code, especially object-oriented code, presents potential problems to management. "It's not just one library of code anymore. You might have one piece of code that touches 80 or 90 other pieces of code," she says, making old-fashioned laissez faire management attitudes downright dangerous.

One such GUI-based tool that can be used for new development, reengineering, reuse, and maintenance and enhancement of exisiting software is Discover, a product of Software Emancipation Technology Inc. in Lexington, Mass.

"SET's Discover is both an analyzer and database constructor," says Charles Wetherell, a senior computer scientist at Adobe Systems Inc. in Mountain View, Calif. With 50 to 100 subpackages that make the company's printer software work on different kinds of printers, Adobe was faced with the challenge to manage and track changes on printer systems with a half-million to a million lines of code. "We have lots of conditionally included code—and 300 technical people working on it—so it's no wonder that no single person knows what it does," says Wetherell.

> **"People who don't think they can change or who have convinced themselves that they are artists will resist the new structure."**
>
> *–Judith Hurwitz*

"People often look for tools to provide a dramatic, hundredfold improvement in productivity by completely changing some aspect of their IT practice," says Wetherell. "Discover didn't impose a style on us. It just gave us the ability to ask the right questions so we could modestly increase everyone's productivity and prevent bugs, which eventually ends up as a big improvement."

Because IT organizations have depended so heavily on the skills of their workforce, "managers have been scared to death of their own people," says SET President and CEO Bob Cramer. "Push them too hard, and they might walk." Now, says Cramer, managers can operate on a more equal footing. In fact, the evolution of more-sophisticated tools allows IS managers, who are used to focusing on the "big picture," to get a handle on the software, manage software as a business asset and improve software quality as a result.

Michael Croxton, vice president for marketing and technical operations at Atlanta-based Softlab Inc., says that almost every CIO today is talking about finding better ways to manage IT processes and leverage existing assets. Softlab's focus has been on providing a set of tools to help managers understand the scope, scale and functionality of Cobol code while also supporting ongoing team efforts on maintenance. These tools help identify software components and provide a structure for managing, controlling and even reengineering those components and their relationships.

Helping managers improve their access to information is also central to the philosophy behind iMETRICS, a product of New York-based Compumetrics. "Executives need a way to get this kind of information without having a technical go-between," says Sidney Finehirsh, company president. But iMETRICS isn't only for managers. Rolled out earlier this year, Finehirsh's tools for midrange computers permits both managers and staff to get current mainframe, utilization, service and even network performance data.

Compuware Inc., a Compumetrics customer based in Farmington Hills, Mich., and maker of mainframe and client/server tools, adopted iMETRICS to better schedule compute-intensive operations and help develop a clearer picture of when to implement hardware upgrades. "It's now much easier to do trend analysis because iMETRICS provides a graphical output that allows management to develop a consistent image of what is really going on," says John Auty, manager of technical support.

At least one area of technology—networks—continues to defy real mastery. While many tool vendors have remained focused on applications, networks have recently been the targets of tool-maker attention. The networking environment is "a quagmire, with organizations straining to get out of an ad hoc, reactive management style and into a proactive way of doing business," says Beverly Dygert of Make Systems Inc. in Mountain View, Calif. To help its customers do just that, her firm offers a suite of six complementary tools called NetMaker XA for both managers and technical personnel.

Make Systems' president, Stephen Howard, echoes Rubin's notion that the task of IS management has become an impenetrable thicket. Application performance planning in a networked environment is "an intersection of black holes," he says. "It's hard to figure out why performance ends up a certain way." And, he notes, most firms have only the most primitive methods for designing networks and tracking their performance.

Howard says that networks so vastly multiply the complexity of system behavior that traditional manual design and management approaches simply fail to measure up. Even automated tools can have their limits. "It is a classic case of garbage in, garbage out," he says "Most of the time even baseline information is absent." In short, there just isn't enough understanding of the dynamic relationship among network components when so many factors can change without much control by IS management.

Make System's answer has been to develop its own suite of tools aimed at supplementing the "jargon and gut smarts" of managers at network integration companies and Fortune 500 corporations. But, says Howard, this is just a first step in an evolution toward agent-based technology that can automatically, and iteratively, evolve optimal network designs on its own by performing initial setup tasks and then honing performance in response to actual use.

Nor has the desktop been forgotten. Its persistent tug on IT resources—and its unpredictable impact on assets—has convinced Microsoft to get into the action. Bob Taniguchi, a Windows 95 product manager in the personal systems division of Microsoft, says that a special set of features for that product, available only to corporate accounts, is targeted at the needs of IT management in particular, giving them back increased control over the desktop environment.

"Many IS managers told us that they wanted [ways to regain control] so that they could avoid problems caused by end users" who fiddle with control panel features to the point where it affects system performance, he explains. Taniguchi says managers will also be able to more easily control access to data and applications while simplifying the user interface where needed and minimize demands for end user support. But even these tools, he says, are just the beginning. "We are really just building the plumbing so that other vendors can come along and build true enterprise tools," he says.

As the power and ease of use of many tools continue to grow, vendors look to offer services that complement their packages. "There is tremendous value in hearing from an outsider how they compare with other well-run shops," says John Thomas, executive vice president at Reston, Va.-based Compass America Inc., a consulting firm specializing in benchmarking. "We have [industry comparative] data that the individual company doesn't," he adds.

"Many customers wrestle with problems so complex that they can have trouble implementing a software solution on their own," says SET spokeswoman Linda Johnson. "That has put SET in the business of not only providing a software product but of actually solving problems."

> **"Managers have been scared to death of their own people. Push them too hard, and they might walk."**
>
> *–Bob Cramer*

Programart Corp., based in Cambridge, Mass., offers a palette of performance improvement services and do-it-yourself tools for analyzing the health of large applications. Bob Burke, deputy director for information management within the federal government's 25,000-person Defense Finance and Accounting Service (DFAS), has used both sides of Programart as part of an effort to consolidate resources inherited from pre-existing, service-specific agencies for the Department of Defense. "We started with 18 different payroll systems, and we are now down to seven and on our way to just two," he says. Managing Application Performance (MAP) is a DOD program based on Programart's methodology, which is actually called Application Performance Management, or APM; STROBE measures performance and efficiency characteristics of application systems; a coupled tool, APMpower, is an analytical engine for analyzing STROBE measurements.

Burke says that the outside help made it possible to effectively reduce machine utilization, thereby simplifying consolidation. Thomas Graves, Programart's Washington manager of DOD projects, says documented savings at DFAS are now in the $10 million range. And, he adds, "that is just the first iteration."

But vendors don't have all the answers, says Gene Plichta, principal engineer at an operation of the Information Systems Division of GTE Government Systems Corp. in Chantilly, Va. As a customer of Make Systems, Plichta says he's satisfied with its approach as far as it goes. However, in a quest to build a better support environment for setting up computer systems and networks for Uncle Sam, Plichta says he evaluated more than 100 products. "Since we couldn't find one tool to do it all, we ended up writing some of our own material to connect other tools," he explains.

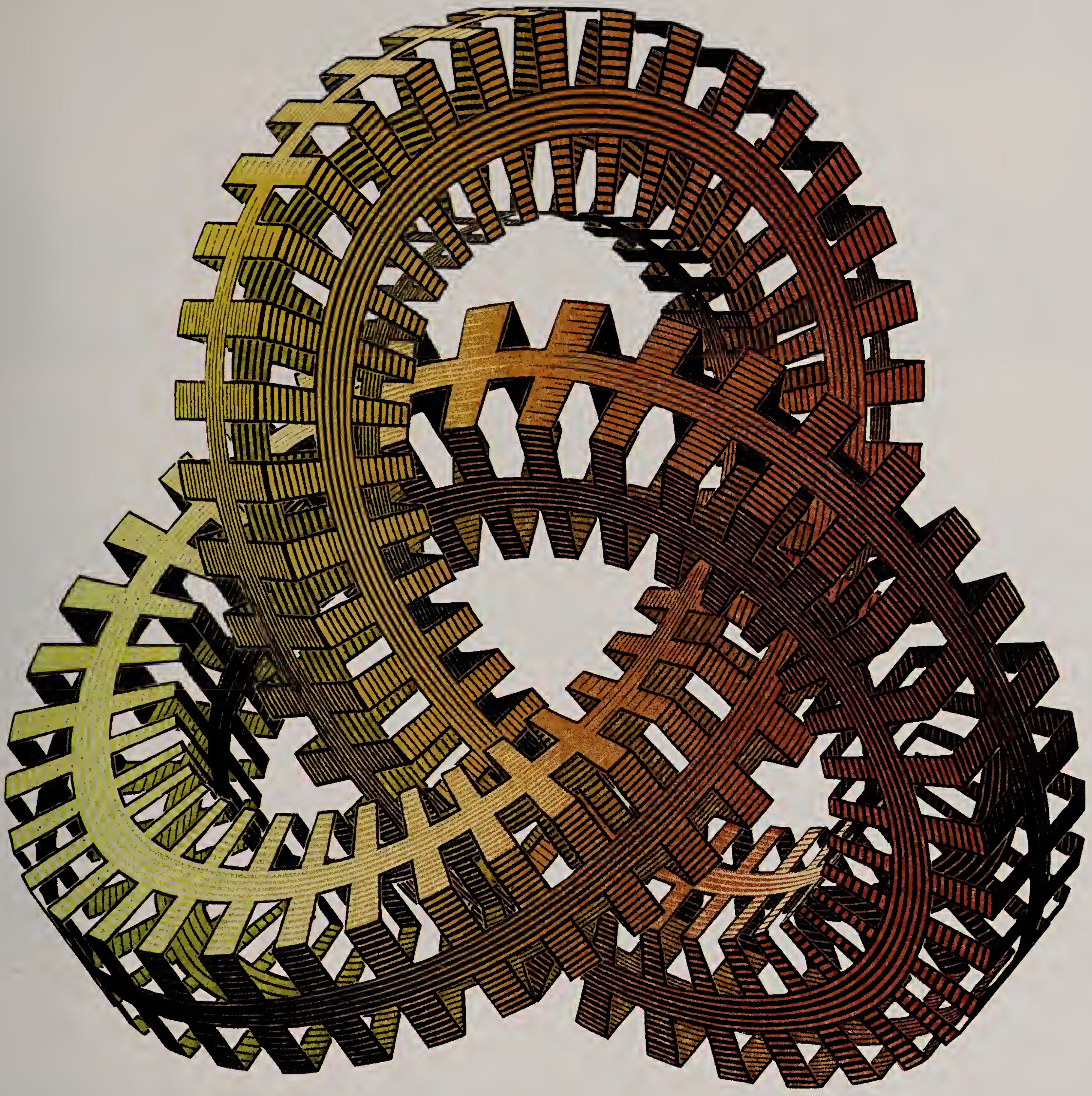
Nonetheless, most everyone is giving a thumbs up to the general trends toward more robust and easy-to-use IS management tools. "I think this technology will become the rule rather than the exception," says Aberdeen's Bishop. "And its development will accelerate through the remainder of the decade."

But the road will not be smooth. Hurwitz warns that the biggest barriers are not technical but cultural. "People who don't think they can change or who have convinced themselves that they are artists will resist the new structure," she says.

The ability to not only highlight technical issues but also help people work together more effectively is crucial to what Croxton at Softlab calls an "enabling infrastructure" approach that has helped his company win customers. "You can talk about providing tools to IS managers so that they can effect control of their organizations, but the tools by themselves won't do it," he says.

SET's Cramer agrees. "We set out to solve a management problem, but if it isn't culturally acceptable—empowering *everyone*—it won't work." CIO

Alan R. Earls is a freelance business writer based in Franklin, Mass.



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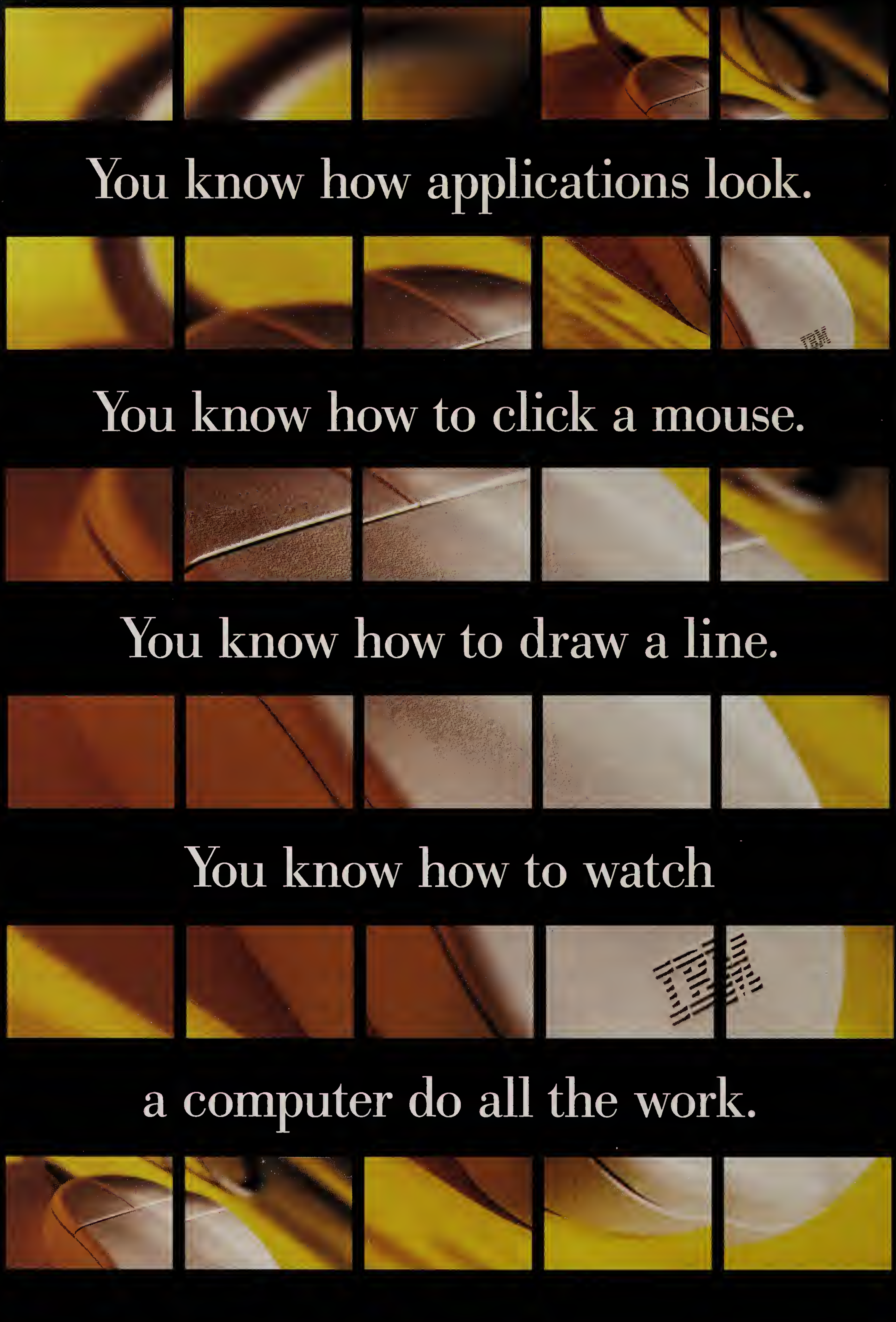
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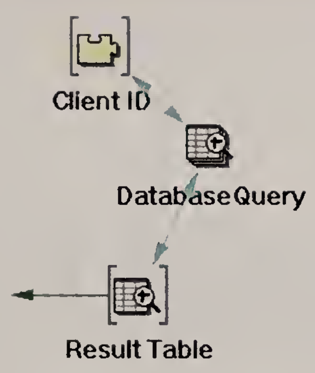

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A Continental Conference

Judging by the experiences they shared at a meeting in Brussels, European IS executives aren't so different after all

BY RICHARD PASTORE

CIO Communications' first conference on foreign soil, the CIO European Symposium held in Brussels this June, was an acknowledgment of two things. First, our readers' IT purview increasingly extends beyond American boundaries. Second, European IS leaders, once felt to be a bit off the pace compared with their U.S. counterparts, are in fact frequently grappling with the same business and technology issues and share the same missions, outlook, business savvy and challenges as their New World brethren (though the limitations imposed by telephone companies seems to be a vexation peculiar to overseas CIOs).

The two-day symposium drew more than 100 attendees to the Belgian capital from across Western Europe, many eager to encounter venerable corporate management icon Peter Drucker for the first time and to discuss the symposium's case study with Michael J. Earl, the London Business School's Andersen Consulting professor of information management, who served as conference moderator as well as case study leader.

Evidence of the similarities between European and U.S. CIOs came through in the case study exercise, which dominated the second half of the conference. The London Business School case, on the transformation of the IS function at British Petroleum Exploration (BPX), was a focal point for debate among the attendees, who broke into small workgroups for the exercise.

CIOs *network at a 19th century chateau (top);* **MICHAEL EARL** *and* **PETER DRUCKER** *share the stage (middle);* **CASE STUDY** *group debates IT moves of British Petroleum.*

Through acquisitions in the 1980s, BPX grew to encompass the exploration and production facilities of three companies. By the close of the decade, with existing production sites peaking and prices falling, the outlook for the business was turning grim. BPX decided to "rationalize" by downsizing the merged businesses with a goal of excising 40 percent of costs. For IS, that meant reducing applications from 950 in 1989 to 450 by 1993. At the same time, its applications budget was cut from $355 million to $110 million and IS staffing from 1,100 to 250. The firm outsourced the bulk of IT operations to a vendor triumvirate.

In discussing the case, several IT chiefs proposed that BPX, in radically downsizing and outsourcing, risked crippling its ability to add value to the enterprise and respond to unexpected business needs or opportunities. Extrapolating BPX's actions, some attendees concluded that the firm might as well divest the IT function completely. Other critics saw the bulk of the BPX effort as IS rationalization rather than true transformation. Such consolidation, while extreme, is relatively straightforward and part of every CIO's mandate. The real challenge would come from increasing IS's contribution to the business, something that still largely lies ahead for BPX, the workgroups concluded.

Some attendees sought to distance their own actions from BPX's, noting that they and their companies are following a different path—one that should sound familiar to U.S. CIOs. They are focusing more on aligning IS strategy with the business, using

PHOTOS BY FREDERIC REMOUCHAMPS

IS to achieve business objectives and ensuring an infrastructure that allows organizational flexibility.

After the workgroups presented their findings on the case, James Hood, BPX Group IT leader, gamely took the hot seat to answer questions and criticisms and shed light on the realities of the transformation. First, he admitted, there was no grand plan for IS restructuring. It all happened a bit at a time as a relationship developed between the BPX CEO and IS chief.

Hood took exception to the contention that IS had not added value through the transformation. "We changed the architecture to one where everyone has connectivity, everyone uses e-mail," Hood said. "It has hugely improved the way people work, even though it was put in to reduce cost."

Hood noted that achieving the expected benefits of outsourcing has been a trial. Part of the reason is that the vendor reps BPX negotiated services with aren't the same ones involved with providing the services. Now BPX is trying to encourage the outsourcing vendors to reengineer the way they supply IT services.

Discussions of outsourcing IS departments usually bring up the point of the future role of the CIO, and European IS leaders are eager to speculate on this subject. Many attendees favored the popular U.S. view that their role will shift toward a strategic focus rather than a service orientation. CIOs will also have to maintain a cross-enterprise perspective and act as internal consultants and infrastructure stewards, they predicted.

Professor Earl capped the case discussion by sharing insights gleaned from his studies of why some CIOs survive in the job and others do not. He described types of behaviors that appear to contribute to the success or downfall of IS directors. Some nonsurvivors clash with corporate executives over the need for long-term architecture planning versus quick-payback IT projects. Others succumb because they take on too large a portfolio of systems projects. Still others are vulnerable because they are perceived as technology specialists with only a limited role in the business.

Earl also identified a set of behaviors that can help ensure success:

- Obsessively and continuously focusing on business imperatives
- Interpreting external IT success stories
- Ensuring an IS performance track record
- Concentrating IS development on a few key projects and eschewing portfolios
- Playing a transformation role
- Contributing to the business thinking

DINNER DISCUSSIONS: *perspectives from multiple nations*

Lest anyone think that the entire symposium was an exercise in CIO navel gazing, Peter F. Drucker, Clarke professor of social science and management at the Claremont Graduate School in California, offered a wider perspective—the role of Europe in the global economy. The fact is, Drucker said, the vaunted European Economic Union has been a severe disappointment. "Europe has frittered away its opportunities and lost position in the world economy pretty seriously," he declared. Japan's share of world manufacturing has gone up to 22 percent from 10 percent in the early 1980s, and that came almost entirely out of Europe's hide. The problem is that the EU is becoming irrelevant, as are NAFTA and other regional economic alliances.

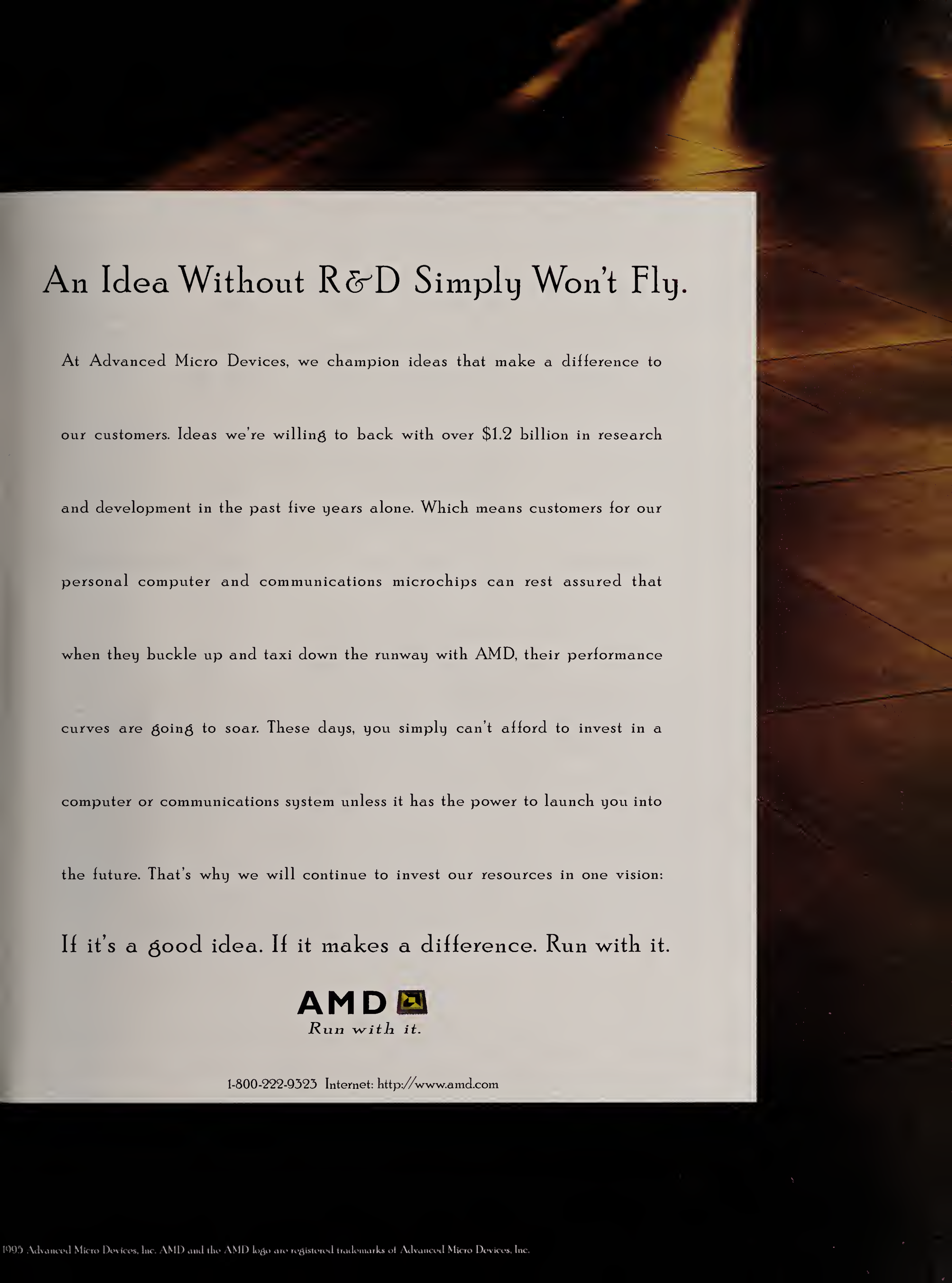
"Regionalism is no longer the driving economic force," Drucker argued. The controlling factor is now domestic policies. "Every single government of a developed country will have to change its assumptions and basic policies in controlling money because the global economy is not willing to support a country that has to finance itself by foreign borrowing." The welfare state and the deficits it creates will have to be dealt with before Europe and other economies can prosper.

On the positive side, Drucker noted that Europe has the inherent ability to compete globally because of its tremendous knowledge of fairly narrow technologies and markets, such as Northern Italy in shoes and Antwerp in diamonds. "But you have a very great problem in over-regulation, particularly in the social sector, and overprotection in the financial sector," he added.

What are the implications for IS? In the new world economy, money increasingly becomes information, and accounting as a practice is more of an information science. Yet IS and accounting people typically know nothing about each other's functions. That needs to change, according to Drucker. "By 2010, the CIO will be in charge of both accounting and technology," he predicted. "We'll have to learn to bring the two together."

Drucker closed by echoing the sentiments of many of the European IS leaders in attendance on the evolving role of IS. "It can't remain a support function," he contended. "It must become a business function." IS must be the department that supplies vision, concepts and understanding of what information means to particular business functions. "We are at the end of the tool-making period and at the beginning of the tool-using period."

CIO's next European conference will be held in June 1996; the location has yet to be determined. CIO



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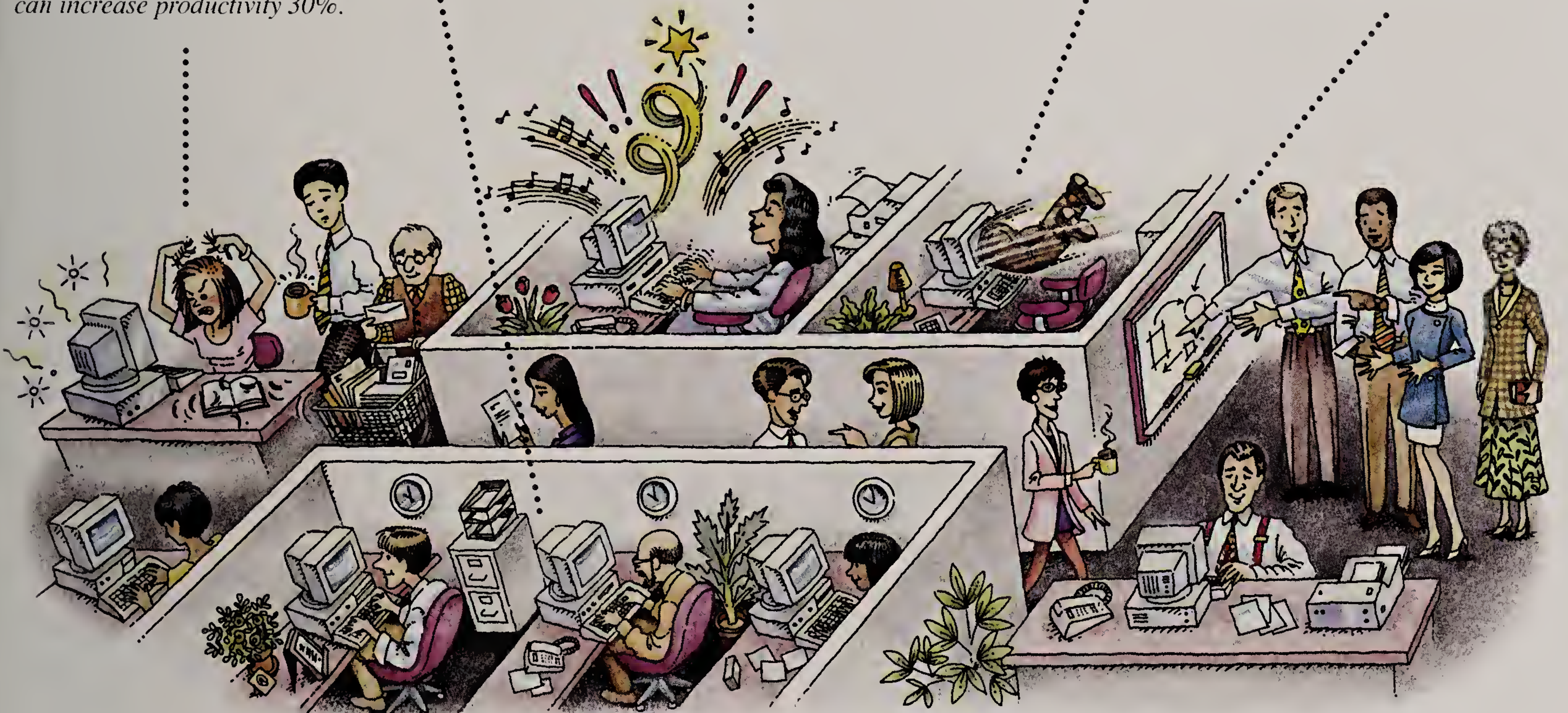

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Universal E-mail

Mail hubs help Honeywell divisions cross intracompany boundaries while preserving their autonomy

When companies forge new working relationships among formerly disparate groups, many find their electronic-mail systems need some fine-tuning. But when Honeywell Inc. pledged to embrace cross-functional teams, it discovered a bit more of a mess than most. Over the years, more than 20 e-mail systems had found their way into the company's three divisions, which encompass nearly 50,000 employees in 95 countries.

Although standardization was needed, Honeywell was loathe to toss out existing systems and impose a costly new process on its highly decentralized divisions. The Minneapolis-based maker of industrial, aviation, home and building control systems instead chose to streamline and then connect all of its e-mail systems.

"Honeywell has very strong and autonomous business units, and they had a classic communications fragmentation," explains Don Parker, an account executive at Control Data Systems Inc., the Arden Hills, Minn., electronic messaging integrator that eventually won the contract to handle Honeywell's e-mail needs. Although Honeywell has a corporate IS department, it isn't directly responsible for regional and local business groups scattered worldwide. "There was no enterprisewide strategy, and there were pockets where [workgroups] couldn't communicate with one another."

In late 1991, a new CIO and several other new IT managers joined the company, and all were dismayed to find no common mail directory to allow mail exchange among divisions. A companywide survey revealed that Honeywell was using 22 different mail installations, including Microsoft Mail, various Unix-based systems, Digital Equipment Corp. and Macintosh products, and LAN-based products from Novell and Banyan.

Armed with the survey results, IT managers at headquarters hired Bill McGarry as Honeywell's manager of technology integration. McGarry formed an electronic messaging steering committee, which developed a three-pronged strategy to reduce the number of supported mail technologies, provide reliable transport and interconnectivity among the remaining technologies, and develop and deploy a common directory to facilitate and encourage interdepartmental sharing.

The committee chose to standardize on a range of technologies that would still allow business units to choose a mail system tailored to their work needs and hardware requirements. Honeywell now supports six basic mail systems—Microsoft Mail for PCs, Microsoft Mail for Macintosh, Z-Mail, All-In-1 Mail, Unix mail and Mapper Mail—which run on one of three mail standards—X.400, SMTP (simple mail transfer protocol), or Microsoft Corp.'s proprietary protocols.

Next, Honeywell put out an RFP for a mail switch to interconnect those six mail systems globally. The company chose Control Data's Mail*Hub, which comprises X.400 message handling and an X.500 directory for all mail addresses. The mail-hub system runs on five Sun Microsystems Inc. servers worldwide.

Control Data installed an AppleTalk gateway for Macintosh clients and integrated existing X.400 and SMTP systems into its Mail*Hub. To accommodate several thousand Microsoft Mail users who had required 330 separate post offices, Control Data integrated the Microsoft messaging environment into the standards-based X.400 infrastructure.

Control Data also manages and monitors the e-mail system around the clock. This arrangement—the first of its kind for Control Data—was proposed by Honeywell. "Control Data's bid was not a service bid, but we preferred to buy service rather than put a system and personnel into place," explains McGarry.

As more business units are added to the system, McGarry says mail is becoming an embedded business process. Paper and voice-mail traffic has shifted to the e-mail system, and some groups are testing mail-enabled applications such as scheduling.

"Success is measured when something goes wrong in the mail environment," he says. "Customers call up and scream, so we know they're viewing it as a mission-critical application." *–Tracy Mayor*

Tracy Mayor is a freelance writer and editor based in Beverly, Mass.

VITAL STATISTICS

Organization: *Honeywell Inc., Minneapolis*

Application: *Global e-mail hub and directory*

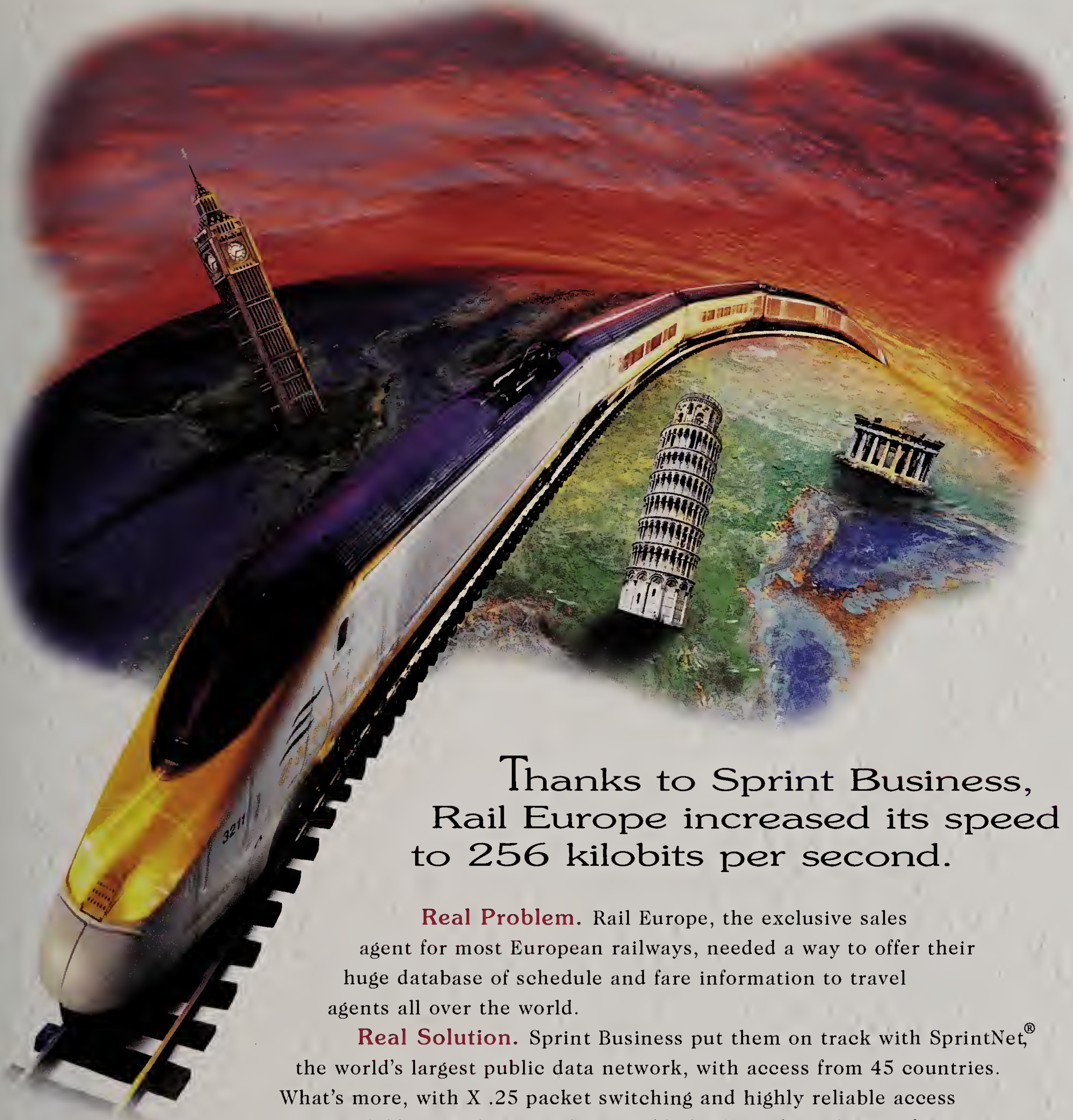
Sponsor: *Bill McGarry, technology integration manager*

Technologies: *Control Data Systems Inc.'s Mail*Hub software; X.400, SMTP and Microsoft Mail gateways; Sun Microsystems Inc. Sparcstation servers; Hewlett-Packard Co. OpenView network monitoring software*

Scope: *38,000 e-mail users in 95 countries*

Objective: *Develop a single mail directory to facilitate communication among business groups worldwide*

Payoff: *Integration of e-mail into business processes, increased sharing of business knowledge among workgroups, reduced paper and voice-mail traffic, improved internal awareness of company issues*



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